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APPENDICES

- A.** Professional Engineering Licensing Information
- B.** American Society of Civil Engineers (ASCE) Code of Ethics

The rules and regulations stated in this handbook are for information only and in no way constitute a contract between the student and Cornell University. The University reserves the right to change any regulations or requirement at any time.

It is the policy of Cornell University to actively support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age, or handicap. The University is committed to maintenance of affirmative action programs that will assure the continuation of such equal opportunity. Sexual harassment is an act of discrimination and, as such, will not be tolerated. Inquiries concerning the application of Title IX may be referred to Cornell's Title IX coordinator (see <http://hr.cornell.edu/diversity/reporting/> or contact the Office of Workforce Policy and Labor Relations, 391 Pine Tree Road, Ithaca, NY 14850; Phone (607) 254-7232; email equalopportunity@cornell.edu) Assistance is also available through the **Diversity Programs Office** of the College of Engineering in 146 Olin Hall, Phone: 607-255-6403.

Cornell University is committed to assisting those persons with disabilities who have special needs. Information for accommodations for faculty, staff, students, and visitors may be found at www.cornell.edu/diversity.

I. Introduction

Welcome to the School of Civil and Environmental Engineering (CEE) at Cornell. The intent of this handbook is to introduce you to the School, the faculty, and our undergraduate academic programs and activities in CEE. We hope that your undergraduate years in our School will be rich and rewarding both academically and personally.

Educational Objectives

The School of Civil and Environmental Engineering at Cornell University is dedicated to providing the highest quality broad-based technical, scientific, and liberal arts education. We create and maintain an outstanding educational program in a climate that fosters diverse skills designed for professional success.

The **Program Educational Objectives** for the Civil Engineering major are to prepare our students to:

- Achieve excellence in engineering decision-making and design,
- Attain leadership careers in engineering practice,
- Complete graduate professional engineering education,
- Pursue advanced study and research in engineering, and
- Engage in diverse, alternative career choices.

The **Student Outcomes** for the Civil Engineering major are:

1. Understanding of engineering fundamentals and their application to the solution of problems,
2. Completion of a broad-based curriculum rich in liberal studies intended to raise awareness of cultural contexts and societal issues,
3. Creation of sound designs subject to uncertainty and to multiple societal and engineering constraints,
4. Experience with the process of research inquiry,
5. Demonstrated skill at learning in an atmosphere with a high level of information input,
6. Project management skills and an aptitude for management of multiple tasks,
7. Creative, independent thinking and a tolerance for ambiguity,
8. Communication skills, both written and oral,
9. A capacity for leadership, inclusiveness, and teamwork,
10. Professionalism, including ethics,
11. A desire to provide service to society, and
12. An understanding of the contemporary dynamism of the CEE profession and of the need for continued scholarship.

Civil and Environmental Engineering as a Profession

The field of civil and environmental engineering is a people-serving profession. Civil and environmental engineers plan, design, construct, and operate facilities that are used every day – buildings, bridges and space stations, water purification and distribution systems, highways, tunnels, airports, rapid transit systems, dams and electrical generating stations, and other constructed facilities. They analyze land, water, air, and pollution problems; develop designs for pollution and hazardous waste control facilities; and oversee the construction

and operation of those facilities. They participate in city planning, in efforts to overcome infrastructure deterioration, in the development of water resource systems, and in the design and operation of other systems fundamental to the quality of life and the preservation of the quality of the environment. A personal reward for civil and environmental engineers is the satisfaction gained from creating enduring constructed facilities that provide communities with places to live, work, and play. Civil and environmental engineers are also concerned with sensing and interpreting the environment using satellite and aircraft imaging. As a profession, civil and environmental engineers must help meet the basic needs of society through economical, safe, aesthetically appealing, sustainable and environmentally sound solutions.

History of Civil and Environmental Engineering at Cornell University

Civil engineering has had a long and distinguished history at Cornell. Cornell's first class of engineers graduated in 1869, and was all civil engineers. The first Ph.D. was awarded at Cornell in 1870 and was in Civil Engineering. The first woman to receive a civil engineering degree at Cornell was Nora Stanton Blatch 1905; her grandmother was Elizabeth Cady Stanton and her mother was Harriot Stanton Blatch, both leaders in the Women's Rights Movement and in the struggle for women's suffrage. Nora Blatch became the first woman member of the American Society of Civil Engineers (ASCE), the national professional engineering society formed in 1852.

The School changed its name to "Civil and Environmental Engineering" in the early 1970's, to emphasize the coverage of environmental engineering, traditionally a subject area within civil engineering. Currently the School offers two ABET accredited BS degree programs: Civil Engineering and Environmental Engineering. The School is ranked as one of the top civil and environmental engineering departments in the United States. Our alumni hold key positions in engineering, construction, research and development, government, manufacturing, sales, education, and other areas across the U.S. and in foreign countries.

School Administration

Director of Civil and Environmental Engineering: Professor Linda K. Nozick

Executive Assistant: Jeannette Little
220 Hollister
607 255-3690

Associate Director for Undergraduate Programs: Professor Derek Warner

Undergraduate Major Coordinator: Laura Ricciuti
221 Hollister
607 255-3412

Director of Graduate Studies and Chair, Master of Engineering Program: Professor Mircea Grigoriu

Graduate Program Coordinator: Melissa Totman
219 Hollister
607 255-7560

Chair, Master of Engineering Management Program: Professor Patrick M. Reed

Program Coordinator: Tania Sharpsteen
215A Hollister
607 255-3553

Main Office Contacts:

Office Manager: Beth Korson 220 Hollister 607 255-3438

Director of Administration: Joe Rowe 220 Hollister 607 255-0549

Finance Specialist: Stacey Shirk 220 Hollister 607-255-3684

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College of Engineering, Cornell University
Hollister Hall, Ithaca, NY 14853-3501
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www.cee.cornell.edu

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

Faculty and Teaching Staff Listing by **Mission Area** and **concentration** for 2019-20

Many faculty members participate in more than one concentration

Linda K. Nozick, Director

Derek Warner, Associate Director

Environmental Processes

James J. Bisogni⁴
Richard I. Dick⁴
Greeshma Gadikota
James M. Gossett⁴
April Gu
Damian Helbling
Leonard W. Lion⁴
Matthew C. Reid
Ruth E. Richardson

Environmental Fluid Mechanics & Hydrology

John D. Albertson
Wilfried H. Brutsaert⁴
Edwin A. Cowen
Peter Diamessis
James T. Jenkins⁴
Qi Li
Philip L-F. Liu⁴
Patrick M. Reed

Environmental & Water Resource Systems Engineering

John D. Albertson
Daniel P. Loucks⁴
William D. Philpot
Patrick M. Reed
Michael Rolband⁵
Christine A. Shoemaker⁴
Jery R. Stedinger⁴

Engineering Management

Huaizhu Gao
Mircea D. Grigoriu
Kenneth C. Hover
Andrea Ippolito¹
Jacob Mays
Robert Newman¹
Linda K. Nozick
Patrick M. Reed
Christine A. Shoemaker
Jery R. Stedinger
Francis M. Vanek¹

Transportation Systems

Ricardo A. Daziano
Huaizhu Gao
Arnim H. Meyburg⁴
Linda K. Nozick
Samitha Samaranayake

Remote Sensing

William D. Philpot

Geotechnical Engineering

James T. Jenkins⁴
Thomas D. O'Rourke⁴
Harry E. Stewart
Greeshma Gadikota

Structural Engineering

John F. Abel⁴
Christopher Earls
Kifle G. Gebremedhin³
Mircea D. Grigoriu
Kenneth C. Hover
Anthony R. Ingraffea⁴
Gregory C. McLaskey
Sriramya Nair
Teoman Peköz⁴
Matthew T. Reiter⁵
Derek Warner

¹ Lecturer, Sr. Lecturer and/or Research Assoc.

² Adjunct Faculty Member

³ Primary Appointment BEE

⁴ Emeritus Faculty

⁵ Professor of Practice

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

FACULTY RESEARCH INTERESTS AND CONTACT INFORMATION

John D. Albertson

113 Hollister Hall, jda59

Professor (Ph.D. California/Davis): Hydrology, Boundary Layer Meteorology, Land-Atmosphere Interaction, Turbulent transport process, Wind energy.

Edwin A. Cowen

119 Hollister Hall, eac20

Professor (Ph.D. Stanford): environmental fluid mechanics, wave hydrodynamics, coupled air-water transfer processes, mixing and transport processes in the environment, experimental methods.

Ricardo A. Daziano

305 Hollister Hall, rad77

Associate Professor, (Ph.D. Laval, Quebec): pro-environmental preferences, sustainable travel behavior, renewable energy, environmentally-friendly energy sources.

Peter Diamessis

105 Hollister Hall, pjd38

Associate Professor (Ph.D, California/San Diego): environmental fluid mechanics, hydrodynamics of the coastal/open ocean and lakes, turbulence modeling, hydrodynamic instability theory, spectral methods in scientific and engineering computation, high performance parallel scientific computing.

Christopher J. Earls

365 Hollister Hall, cje23

Professor (Ph.D. Minnesota): Structural stability, computational and structural mechanics, behavior and design of metal structures

Greeshma Gadikota

117 Hollister Hall, gg464

Assistant Professor, Croll Sesquicentennial Fellow (Ph.D. Columbia): sustainable energy and resource recovery, negative emission technologies, cross-scale fluid-surface interactions for harnessing subsurface resources and developing low carbon energy and resource conversion technologies, engineering elemental cycles with a focus on carbon transformations

Huaizhu Gao

313 Hollister Hall, hg55

Associate Professor (Ph.D. California/Davis): transportation systems analysis, transportation and environment planning, urban traffic management.

Andrea Giometto

265 Hollister Hall, ag956

Assistant Professor, Ecological patterns and processes, spatial growth of microbial communities, spatiotemporal dynamics of biological invasions

Mircea D. Grigoriu

363 Hollister Hall, mdg12

Professor (Ph.D. MIT): structural engineering, structural reliability, structural dynamics, random vibration, stochastic mechanics.

April Z. Gu

263 Hollister Hall, azg4

Professor (Ph.D. Washington): biotechnology for water and wastewater treatment, biological nutrient removal and recovery, biosensors for water quality monitoring, toxicogenomics-based toxicity assessment, phosphorus cycling and bioavailability of nutrients.

Damian E. Helbling**273 Hollister Hall, deh262**

Assistant Professor (Ph.D. Carnegie Mellon): water quality, chemical and biological processes, transport and fate of emerging contaminants, sustainable water and wastewater treatment technologies

Kenneth C. Hover**302A Hollister Hall, kch7**

Professor (Ph.D. Cornell): concrete material properties and construction techniques, durability of construction materials.

Qi Li**107 Hollister Hall, ql56**

Assistant Professor (Ph.D. Princeton): boundary layer turbulence, fluid-structure interactions, urban heat island, pollutant dispersion, urban sustainability, computational fluid dynamics.

Daniel P. Loucks**403 Hollister Hall, dpl3**

Professor Emeritus (Ph.D. Cornell): water resource and environmental management systems, interactive multimedia modeling.

Jacob P. Mays**323 Hollister Hall, jpm452**

Optimization under uncertainty, statistical learning, electricity markets, energy systems

Gregory C. McLaskey**369 Hollister Hall, gcm8**

Assistant Professor (Ph.D. California/Berkeley): earthquake mechanics, friction and interfaces, nondestructive testing, piezoelectric sensor calibration, the method of acoustic emission, wave propagation, seismology and earthquake scaling.

Sriramya D. Nair**371 Hollister Hall, sn599**

Assistant Professor (Ph.D. UT Austin): sustainable cementitious materials, cementing of geothermal wells, abandonment of oil and gas wells, 3D printing of concrete, characterization of structural materials across length scales, rheology, micro-mechanical investigations.

Linda K. Nozick**311 Hollister Hall, lkn3**

Professor (Ph.D. Pennsylvania): engineering management, transportation systems analysis, systems engineering.

Thomas D. O'Rourke**323 Hollister Hall, tdo1**

Thomas R. Briggs Professor of Engineering, Emeritus (Ph.D. Illinois): earthquake engineering, geotechnical engineering and analysis, lifeline systems, soil-structure interaction, underground technologies.

William D. Philpot**453 Hollister Hall, wdp2**

Professor (Ph.D. Delaware): remote sensing, digital image processing, radiative transfer.

Patrick M. Reed**211 Hollister Hall, pmr82**

Professor (Ph.D. Illinois): Environmental and water resources systems; multiobjective planning and management, evolutionary computation; high-performance computing; uncertainty in decision making.

Matthew C. Reid**267 Hollister Hall, mcr239**

Assistant Professor (Ph.D. Princeton): Environmental biogeochemistry; coupled biological and physiochemical processes in soil-water systems; engineered ecosystems for sustainable water quality improvement.

Matthew T. Reiter**315 Hollister Hall, mtr68**

Professor of Practice (M.Eng Cornell) Structural engineering, structural steel, masonry, structural mechanics and materials, engineering management

Ruth E. Richardson**271 Hollister Hall, rer26**

Associate Professor (Ph.D. California/Berkeley): microbiology, application of molecular techniques to understand microbial activities, environmental microbiology of water and soil systems, bioremediation of subsurface contaminants, fate and transport of microbial and chemical contaminants, Civil & Environmental Engineering.

Samitha Samaranayake**317 Hollister Hall, ss3496**

Assistant Professor (Ph.D. California/Berkeley): transportation systems modeling and optimization, network algorithms, decision making under uncertainty, operations research.

Jery R. Stedinger**213 Hollister Hall, jrs5**

Professor Emeritus (Ph.D. Harvard): stochastic hydrology, water resource systems operations and planning, risk analysis.

Harry E. Stewart**324 Hollister Hall, hes1**

Associate Professor (Ph.D. Massachusetts): geotechnical engineering, dynamic behavior of soils, instrumentation.

Francis M. Vanek**307 Hollister Hall, fmv3**

Senior Lecturer (PhD. Pennsylvania): environmental impact of freight transportation, transportation energy, energy efficiency and renewable energy, green building, systems engineering process applied to commercial product development.

Derek H. Warner**373 Hollister Hall, dhw52**

Associate Professor (Ph.D. Johns Hopkins): computational solid mechanics, atomistic modeling, deformation and fracture mechanisms, additive manufacturing, reliability, advanced computing.

II. The Undergraduate Overview in Civil and Environmental Engineering

The School of Civil and Environmental Engineering (CEE) offers two undergraduate majors: Civil and Environmental. Graduates from the Civil Major earn a Bachelor of Science (B.S.) bearing the title "Civil Engineering"; the Civil Engineering degree major requires a minimum of 125 academic credit hours. The major in Environmental Engineering is offered jointly by faculty members in CEE and faculty in Biological and Environmental Engineering (BEE). Graduates from the Environmental Major earn a Bachelor of Science (B.S.) bearing the title "Environmental Engineering". The Environmental Engineering degree major requires a minimum of 125 academic credit hours. *This handbook deals **only** with the Civil Engineering Major.* Both degree programs are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. Accreditation means, among other things, degree recipients are automatically eligible to take the first part of the examination for professional registration and to be credited with 8 years of Education/Experience towards the total of 12 years needed for full registration (see the section on [Professional Registration](#) and [Appendix B](#)).

Within the broad-based Civil Engineering Major, students may undertake either a general civil engineering curriculum or may focus on civil infrastructure, fluid mechanics, hydrology, and water resource systems, environmental engineering, transportation, and smart cities. The Civil Major is summarized in the tables and flow chart in [Section III](#), while samples of possible program foci within the Civil Major are similarly presented in [Section IV](#).

Affiliation Requirements for the Civil Major

The requirements for affiliation with the Civil Major are as follows.

- (1) Have a cumulative GPA of at least 2.0,
- (2) Have a GPA of at least 2.0 in all math, science, and engineering courses,
- (3) Receive a grade of at least C in ENGRD 2020

College of Engineering Requirements

A number of curriculum requirements are set by the College of Engineering. These include Advisor Approved Electives, Technical Communications, and the Liberal Studies Distribution requirement. Not discussed in this handbook are the additional common College requirements usually taken before affiliation such as mathematics, physics, chemistry, and freshman writing seminars. See [Courses of Study](#) or [The Engineering Undergraduate Handbook](#) for details on these requirements.

Project Teams

All CEE project team courses will be offered for 1 credit, S/U. The exception is CEE 2550 that is approved for 1-3 credits S/U.

Advisor Approved Electives

Advisor Approved Electives totaling at least six credits are required. An Advisor Approved Elective is a course selected by the student and accepted by the student's advisor. Advisor Approved Electives should be an appropriate part of an educational plan or objective. This constraint allows flexibility for individual goals while maintaining a coordinated, challenging program. Advisors generally accept as Advisor Approved Electives: Engineering Distribution courses; courses stressing oral or written communication; upper-division engineering courses; advanced courses in math and the biological and physical sciences; and courses in management, business, economics, languages, humanities, and social sciences.) Advisor approved electives may also include project team credits (4 credit maximum) and undergraduate research credits. Students can use multiple courses to attain the six credits and are not limited to taking two three credit courses. Selection of Advisor Approved Electives is an important matter that needs to be discussed by students and their advisors. (Please note that six credits of Advisor Approved Electives will be allowed from ROTC courses at level 3000 or above.)

Technical Communications

Students must complete a course in Technical Communications.
CEE students may choose from one of these options:

1. Take one of these offered courses:

- a. ENGRG 3500 Engineering Communications*
- b. ENGRG 3350 Communications for Engineering Managers*
- c. ENGRG 3340 Independent Study in Engineering Communications
- d. ENGRG 3020 Project Team Communications: Practicum in Technical Writing
- e. ENGRG 3024 Engineering Communication Co-Op

2. The Writing Intensive Coop. An opportunity to combine work and academics. Some co-op students do a significant amount of writing on the job; under certain circumstances, this writing will satisfy the technical-writing requirement. **

3. Take an officially designated Writing-Intensive (W-I) engineering course

(note: this list is not comprehensive; as different engineering departments may offer W-I courses on an ad-hoc basis. It is mandatory that courses marked with an asterisk [*] be taken with their corresponding one-credit ENGRG component):

- a. *AEP/ENGRD 2640: Interfacing the Digital Domain with an Analog World
- b. *BEE/MAE 4530: Computer-Aided Engineering: Applications to Biological Processes
- c. BEE 4730: Watershed Engineering
- d. *BEE 4890: Entrepreneurial Management for Engineers
- e. BME 4190: Laboratory Techniques for Molecular, Cellular, and Systems Engineering
BME 4390: Circuits, Signals and Sensors: Instrumentation Laboratory
- f. BME 4490: Biomechanics Laboratory
- g. CEE 3610: Introduction to Transportation Engineering
CHEME 4320: Chemical Engineering Laboratory
- h. *CS 3152: Introduction to Computer Game Architecture
- i. *CS 4152: Advanced Topics in Computer Game Architecture
ECE 4920: ECE Technical Writing
- j. INFO 1200: Information Ethics, Law, and Policy
- k. *INFO 3152: Introduction to Computer Game Design
- l. *INFO 4152: Advanced Topics in Computer Game Design
- m. MAE 4272: Fluids/Heat Transfer Laboratory
- n. MSE 4030: Senior Materials Laboratory I
- o. MSE 4050/4060 (both): Senior Experimental Thesis I and II

4. COMM 3020 Science Writing for the Media or COMM 3030 Organizational Writing

5. ENGRG 3023 Writing Intensive Opportunity: Practicum in Technical Writing (a 1-credit attachment to an engineering course that is not one of the officially designated writing-intensive courses).

6. Petition: Occasionally, a student will be doing a significant amount and variety of technical writing elsewhere in the College of Engineering. It may be appropriate to petition the CCGB Committee on Technical writing for permission to use this forthcoming (not past) writing to meet the technical writing requirement.

**Also a Liberal Studies Course in the Communications Engineering (CE) Category.*

Students meeting the technical communications requirement with a course that fulfills another requirement (e.g. Liberal Studies, Capstone Design, Major-Approved Elective) may use it to satisfy both requirements.

** Students may also petition to meet the Technical Communications requirement through their Co-op experience. This must be arranged beforehand, on an individual basis through the Director of the Engineering Communications Program. In this case there is no additional credit given, just a notation on the transcript. Student's using Co-op to meet the Technical Communications may have to take an additional Advisor Approved Elective to meet minimum credit requirements for graduation.

For questions or an appointment to discuss options, please contact Rick Evans, the ECP Director at rae27@cornell.edu.

Liberal Studies Distribution*

Global and diverse societies require that engineers have an awareness of historical patterns, an appreciation for different cultures, professional ethics, the ability to work in multi-faceted groups, and superior communications skills. Cornell has a rich curriculum in the humanities, arts, and social sciences, enabling every engineering student to obtain a true liberal education. A minimum of six courses (totaling at least 18 credits) is required, and they should be chosen with as much care and foresight as courses from technical areas. Liberal Studies courses are distributed among seven groups: Cultural Analysis (CA), Historical Analysis (HA), Literature and the Arts (LA/LAD), Knowledge Cognition, and Moral Reasoning (KCM), Social and Behavioral Analysis (SBA), Foreign Language (FL), and Communications in Engineering (CE). The six courses must be chosen from at least three of the seven groups and at least two of the six courses must be at the 2000-level or higher. No more than 2 courses can be chosen from the CE category. The groups are described below.

Cultural Analysis (CA)

Courses in this area study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion), expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community), power and politics (states, colonialism, inequality).

Historical Analysis (HA)

Courses in this group interpret continuities and changes – political, social, economic, diplomatic, religious, intellectual, artistic, scientific – through time. The focus may be on groups of people, dominant or subaltern, a specific country or region, an event, a process, or a time period.

Literature and the Arts (LA/LAD)

Courses in this area explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing, and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge and creative imagination.

Knowledge, Cognition, and Moral Reasoning (KCM)

Courses in this area investigate the basis of human knowledge in its broadest sense, ranging from cognitive faculties shared by humans and animals such as perception, to abstract reasoning, to the ability to form and justify moral judgments. Courses investigating the sources, structure, and limits of cognition may use the methodologies of science, cognitive psychology, linguistics, or philosophy. Courses focusing on moral reasoning explore ways of reflecting on ethical questions that concern the nature of justice, the good life, or human values in general.

Social and Behavioral Analysis (SBA)

Courses in this area examine human life in its social context through the use of social-scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g. in friendship, love, conflict) to larger social organizations (e.g. the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g. discrimination, inequality, prejudice, stigmas, conflict resolution).

Foreign Languages (not literature courses) (FL)

Courses in this area teach language skills, inclusive of reading, writing, listening, and spoken non-English languages, at beginning to advanced levels.

Communication in Engineering (CE)

Courses in this area explore communication as a way of acting in the world. The primary aim is to provide students with the opportunity to practice performing a range of engineering-related communication skills within specific genres (e.g. proposals, reports, and journal articles, oral presentations, etc.). Each of these genres potentially engages a wide variety of audiences and, depending on the particulars of context, each may have multiple purposes. The secondary aim is to enable students to be aware of the choices they make as communicators and to be able to articulate a rationale for those choices. (No more than two courses from this category can be used to satisfy the liberal studies requirement.)

Courses approved as Liberal Studies by the College of Arts and Sciences and the College of Agricultural and Life Sciences are marked in the Courses of Study with the appropriate acronym (CA, CE, HA, LA/LAD, KCM, or SBA). Additional courses that have been reviewed by the College of Engineering and been either approved or determined to be unacceptable can be viewed at <https://apps.engineering.cornell.edu/liberalstudies/> .

* Starting Academic year 20-21, the Engineering College has followed the lead of the Arts and Sciences and changed the structure of the liberal studies courses. There are now 6 groups (instead of 7) because 1 and 3 were combined, and each of these groups have sub-categories. Students still must take courses from at least 3 groups. Students who entered 2019 and prior should follow the old policy, which is shown in the Degree Requirements above. To see the new groups and categories go to pages 18-23 in the [Engineering Undergraduate Handbook](#).

Special Academic Programs

Honors Program

The honors program in Civil Engineering consists of at least nine credits beyond the minimum required for graduation. These nine credits shall be drawn from one or more of the following components (with no fewer than two credits in any selected component):

1. A significant research experience or honors project under the direct supervision of a CEE faculty member using CEE 4000: Senior Honors Thesis (1–6 credits per semester). A significant written report or senior honors thesis must be submitted as part of this component. Letter grade only.
2. A significant teaching experience under the direct supervision of a faculty member using a regularly recognized course in the College of Engineering (i.e., CEE 4010: Undergraduate Teaching in CEE [1–3 credits per semester]).
3. Advanced or graduate courses at the 5000 level or above.

No research, independent study, or teaching for which the student is paid may be counted toward the honors program.

Eligibility: Students must enter with and maintain a cumulative GPA equal or greater than 3.50.

Application: Students must apply no later than the beginning of the first semester of their senior year but are encouraged to apply as early as the first semester of their junior year. All honors program students must be in the program for at least two semesters before graduation.

Each applicant to the Civil Engineering Honors Program must have a faculty advisor or faculty member to supervise the student's individual program. (This need not be the student's faculty advisor.) Applications can

be obtained from Hollister 221. Each program must be approved by the CEE Curriculum Committee, although the committee may delegate approval authority to the Associate Director for all but unusual proposals.

Students successfully completing the Civil Engineering Honors Program will be awarded their diplomas *with Honors in Civil Engineering*.

Minors in Engineering

In 1999, the College instituted minors in engineering. These minors, sponsored by participating departments, promote interdisciplinary study in engineering. CEE students are eligible to receive minors in:

- Aerospace Engineering (MAE)
- Applied Mathematics (MAE)
- Biological Engineering (BEE)
- Biomedical Engineering (BME)
- Business for Engineering Students (AEM)
- Computer Science (CS)
- Electrical and Computer Engineering (ECE)
- Engineering Entrepreneurship
(BEE/CHEME/CE/ECE/MSE/MAE/OR)
- Engineering Management (CEE)
- Engineering Statistics (ORIE)
- Environmental Engineering (BEE/CEE)
- Game Design (CS)
- Industrial Systems & Information Science Technology (ORIE)
- Information Science (CS)
- Materials Science and Engineering (MSE)
- Mechanical Engineering (MAE)
- Operations Research & Mgmt Science (ORIE)
- Robotics (MAE)
- Science of Earth Systems (SES)
- Sustainable Energy Systems
(BEE/CBE/SES/MAE)

Each Minor usually requires a minimum of eighteen credits of coursework and specifies required course(s) and a choice of elective courses. Each department administers its own minor(s) and specific information regarding course work is available from individual departmental undergraduate major offices, from Engineering Advising, or in *The Engineering Undergraduate Handbook*.

For information on other minors available look at this website:

<https://www.cornell.edu/academics/fields.cfm>

When the minor requirements are completed and certified by the offering department, a notation is made on the student's transcript.

Minor in Engineering Management

This minor focuses on giving engineering students a basic understanding of engineering economics, accounting, statistics, project management methods, and analysis tools necessary to manage technical operations and projects effectively. The minor provides an important set of collateral skills for students in any engineering discipline. Students in all Majors may participate in this minor. Civil students may not use courses simultaneously to satisfy a requirement for the minor and as a major approved elective or a design elective. Students must receive a grade of C or better in each course in the minor.

Requirements

At least six (6) courses (minimum of 18 credits), chosen as follows:

<u>Course number and title</u>	<u>(Semester offered, credits)</u>
--------------------------------	------------------------------------

Required Courses (3)

CEE 3230 Engineering Economics and Management	(S,3)
---	-------

or

OR&IE 4150 Economic Analysis of Engineering Systems	(S,4)
---	-------

OR&IE 3150 ¹ Financial and Managerial Accounting	(F,W,4)
---	---------

CEE 3040 ² Uncertainty Analysis in Engineering	(F,4)
---	-------

or

ENGRD 2700 Basic Engineering Probability and Statistics	(F,S,Su,3)
---	------------

or

ECE 3100 Introduction to Probability and Inference for Random Signals and Systems	(S,4)
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Additional Courses—Choose any three³

CEE 5930 ⁴ Data Analytics	(F,4)
--------------------------------------	-------

CEE 5980 Decision Framing and Analytics	(F,3)
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ENRG 3600 Ethical Issues in Engineering Practice	(S,3)
--	-------

NBA 5070 Entrepreneurship for Scientists and Engineers	(F,S,3)
--	---------

or

MAE/ENRG 4610/OR&IE 4152 Entrepreneurship for Engineers	(S,3)
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or

BEE 4890 Entrepreneurial Management for Engineers	(F,3)
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¹ ORIE students must substitute NCC 5560 or NBA 5000 for ORIE 3150

² MAE 3100 cannot be substituted for CEE 3040.

³ Other courses approved by petition in advance.

⁴ This course is not accepted for ORIE students.

Minor in Environmental Engineering

A fundamental challenge for the engineering profession is development of a sustainable society and environmentally responsible industry and agriculture reflecting an integration of economic and environmental objectives. We are called upon to be trustees and managers of our nation's resources, the air in our cities, and water in our aquifers, streams, estuaries, and coastal areas. This minor encourages engineering students to learn about the scientific, engineering, and economic foundations of environmental engineering so that they are better able to address environmental management issues. Students in all majors except Environmental Engineering may participate in this minor. Civil Engineering Majors may not use courses simultaneously to satisfy a requirement for the minor and as a major approved elective or a design elective.

Requirements

At least six (6) courses (minimum of 18 credits), chosen from the following group listings, with at least one (1) course from each group.

Group A. Environmental Engineering Processes

BEE/ENGRD 2510	Engineering Processes for Environmental Sustainability	(F,3)
BEE 4010	Renewable Energy Systems	(S,3)
BEE 4760	Solid Waste Engineering	(S,3)
BEE/EAS 4800	Our Changing Atmosphere: Global Change and Atmospheric Chemistry (offered odd numbered years only)	(F,3)
CEE 3510	Environmental Quality Engineering	(S,3)
CEE 4510	Microbiology for Environmental Engineering	(F,3)
CEE 4530	Laboratory Research in Environmental Engineering	(S,3)
CEE 6530	Water Chemistry for Environmental Engineering	(F,3)
CEE 6560	Physical/Chemical Processes	(F,3)
CEE 6570	Biological Processes	(S,3)
ENGRI 1130	Sustainable Engineering of Energy, Water, Soil, and Air Resources (May count only if taken before the junior year)	(S,3)

Group B. Environmental Systems

BEE 4750	Environmental Systems Analysis	(F,3)
ChemE 6660	Analysis of Sustainable Energy Systems	(F,3)

Group C. Hydraulics, Hydrology, and Environmental Fluid Mechanics

BEE 3710	Physical Hydrology for Ecosystems	(S,3)
BEE 4270	Water Measurement and Analysis Methods	(F,3)
BEE/EAS 4710	Intro. to Groundwater (offered even number years only)	(S,3)
BEE 4730	Watershed Engineering	(F,4)
CEE 3310	Fluid Mechanics (CHEME 3230 or M&AE 3230 may be substituted for CEE 3310)	(F,Su,4)
CEE 4370	Experimental Methods in Fluid Dynamics	(S,3)
CEE 6550	Transport, Mixing, and Transformation in the Environment	(S,3)

Academic Standards

At least C- in each course in the minor and a GPA >2.0 in all courses in the minor.

Other Special Programs

Please consult [*The Engineering Undergraduate Handbook*](#) for information on the following additional special programs: the Independent Major, Double Majors, Dual Degree, Study Abroad, and the Undergraduate Research Program.

Double Major with Environmental Engineering

Civil students interested in pursuing a ***double major with Environmental Engineering*** must have a program plan that reflects distinct thrusts in the two areas. Among the five courses used for Design and Major-approved Electives, the five used for the EnvE degree should include four courses not used for the core program, Design and Major-approved electives for the Civil degree program, and vice versa. The extra courses may be used as advisor approved electives. If interested please complete the double major form available in Engineering Advising (167 Olin Hall) or at the undergraduate coordinator's office, HLS 221.

Architecture Minor

For information about a ***Minor in Architecture*** contact: College of Architecture, Art, and Planning, in 139 Sibley Hall; Tel: (607) 255-5236; Email: cearch@cornell.edu.

Website: <http://aap.cornell.edu/academics/architecture/undergraduate/minor>.

Cantabria Exchange Program

Information on the **Exchange Program with the Universidad de Cantabria** in Santander, Spain is available at: <https://www.engineering.cornell.edu/students/undergraduate-students/special-programs/study-abroad/university-cantabria-exchange-program>

For information on other programs see:

<https://www.engineering.cornell.edu/students/undergraduate-students/special-programs/study-abroad>

III. The Civil Engineering Major

The information on the availability of courses and semester in which they are offered that is mentioned in this section is based on information available as this Handbook goes to press. However, this information is subject to change for reasons such as course enrollments; scheduling conflicts; and decisions by other departments to change, offer, or not offer courses. Other sources include:

The CE Major description on the CEE web page:

<https://www.cee.cornell.edu/cee/programs/undergraduate-programs>

The Courses of Study 2020-2021, a full course catalog of Cornell's academic programs,

<http://courses.cornell.edu/index.php>

Course, time & room rosters and exam schedules

<https://classes.cornell.edu/browse/roster/FA20>

<http://registrar.sas.cornell.edu/Sched/exams.html>

A roster of courses offered by CEE are available on the CEE web site at

<https://www.cee.cornell.edu/cee/programs/courses>

Engineering Distribution Courses

Students planning to enter the broad-based Major of Civil Engineering are required to take ENGRD 2020, *Statics and Mechanics of Solids* (F,S,4), either before or during the sophomore year. Students are strongly advised to take ENGRD 2020 no later than the Fall semester of sophomore year because, in the spring semester, students will usually take CEE 3710 and/or MAE 2030, both of which have ENGRD 2020 as a prerequisite.

A student must also take a second Engineering Distribution course. The following recommendations are made based on area of interest:

- Civil Infrastructure, Structural Engineering, and Civil Engineering Materials
ENGRD/MSE 2610 Mechanical Properties of Materials:
From Nanodevices to Superstructures (F,3)
- Hydraulics / Hydrology / Water Resources
ENGRD/MAE 2210 Thermodynamics (F, Su,3)
- Transportation
ENGRD/CS 2110 Object-Oriented Programming and Data Structures (F,S,Su,3)
- Environmental
ENGRD/BEE 2510, Engineering Processes for Environmental Sustainability (F,3)
- For all interests
ENGRD/CEE 3200 Engineering Computation (S,4)

Core Courses for the Civil Major

Required Major Core Courses:

CEE 4780	Structural Dynamics and Earthquake Engineering	(S,3)
<i>or</i>		
MAE 2030	Dynamics	(S,3)
ENGRD/CEE 3200 ¹	Engineering Computation	(S,4)
CEE 3040 ³	Uncertainty Analysis in Engineering	(F,4)
CEE 3230	Engineering Economics and Management	(S,3)
CEE 3310	Fluid Mechanics	(F,4)
CEE 3410	Geotechnical Engineering for Energy, Environment and Civil Infrastructure	(F,4)
BEE/ENGRD 2510 ¹	Engineering Processes for Environmental Sustainability	(F,3)
CEE 3610	Introduction to Transportation Engineering	(S,3)
CEE 3710	Structural Modeling and Behavior	(S,4)
ENGRC XXXX ²	Technical Communications	(F,S,Su,3)

¹ Students using this course as an Engineering Distribution Course must take an additional Major-Approved Elective. A course may not count as both a distribution course and a core course.

² Please see page 9 for a listing of appropriate [Technical Communications courses](#). Students meeting the Technical Communications requirement with a course that fulfills another requirement must take another Advisor-Approved Elective.

³ ENGRD 2700 (F,S,Su,3) will be accepted (by petition to CEE) as a substitute for CEE 3040 if taken prior to affiliation with the CEE major or if necessary due to scheduling conflicts caused by Co-op or Study Abroad programs.

Exceptions

Students may substitute CEE 4725 for either BEE 2510 or CEE 3610, if they also complete either CEE 4730 or CEE 4740. However, CEE 4725 will then count as a Core Course only and not as a CEE Design course or Major-Approved Elective.

Design Courses and Major-Approved Electives for the Civil Major

Students must take a total of five courses from the following lists of electives. At least three of these courses must be CEE Design Courses (designated by an asterisk), one of which must be a "capstone" course (designated by **bold** type).

Fall Courses

* BEE 4730 Watershed Engineering	(F,4)
BEE 4750 Environmental System Analysis	(F,3)
* CEE 4210/6210 Renewable Energy Systems	(F,3)
CEE 4510 Microbiology for Environmental Engineering	(F,3)
* CEE 4565 Waste Water Processes and Resources Recovery	(F,3)
CEE 4620/6620 Analysis and Control of Transportation Systems and Networks	(F,3)
* CEE 4640/6648 Sustainable Transportation Systems Design	(F,3)
* CEE 4730 Design of Concrete Structures	(F,4)
CEE 4725/6725 Intermediate Solid Mechanics	(F,4)
CEE 4770 Natural Hazards, Reliability, and Insurance	(F,3)
* CEE 4800 Engineering Smart Cities	(F,3)
CEE 4930/5930 Data Analytics	(F,4)
CEE 5200 Economics of the Energy Transition	(F,3)
CEE 5240 Model Based Systems Engineering	(F,4)
CEE 5735- Mathematical Modeling of Natural and Engineered Systems	(F,3)
* CEE 5740 – Intermediate Behavior of Metal Structure	(F,3)
CEE 5980 Introduction to Decision Analysis	(F,3)
CEE 6000 Advanced Numerical Methods for Engineers	(F,3)
CEE 6055 Stochastic Processes in Biology & Environment	(F,3)
CEE 6100 Remote Sensing Fundamentals	(F,3)
CEE 6530 Water Chemistry for Environmental Engineering	(F,3)
CEE 6560 Physical/Chemical Process	(F,3)
CEE 6640 Microeconometrics of Discrete Choice	(F,3)
CEE 6735 Characterization of Structural Materials Across Length Scales	(F,3)
CEE 6790 Time Series Data Analysis for Civil, Mechanical and Geophysical Applications	(F,3)
CEE 6930 Public Systems Modeling	(F,3)
EAS 4570 Atmospheric Air Pollution	(F,3)
EAS/MAE 6480 Air Quality and Atmospheric Chemistry	(F,3)
ENMGT 5900 Economics for the Energy Transition	(F,3)
MAE 4021 Wind Power	(F,3)
MAE 4700 Finite Element Analysis for Mechanical & Aerospace Design	(F,3)
ORIE 4330 Discrete Models	(F,4)

Spring Courses

* BEE 4760 Solid Waste Engineering	(S,3)
CEE 4330 Physical Hydrology in the Built and Natural Environments	(S,3)
CEE 4370 Experimental Methods in Fluid Dynamics	(S,3)
CEE 4530 Laboratory Research in Environmental Eng	(S,3)
* CEE 4565 Wastewater Processes and Resources Recovery	(S,3)
* CEE 4590 Sustainable Envir. Tech. for Remediation and Resources Recovery	(S,3)
CEE 4665 Modeling and Optimization for Smart Infrastructure Systems	(S,3)
* CEE 4740 Introduction to the Behavior of Metal Structures	(S,4)

* CEE 4750 Concrete Materials and Construction	(S,3)
CEE 4780 Structural Dynamics and Earthquake Engineering	(S,3)
* CEE 4565 Wastewater Processes and Resources Recovery	(S,3)
CEE/ BEE 4880: Applied Modeling and Simulation for Renewable Energy Systems	(S,3)
CEE 5745/6745, Inverse Problems: Theory and Applications	(S,3)
CEE 6200 Water-Resources Systems Engineering	(S,3)
CEE 6550 Transport, Mixing, and Transformation in the Environment	(S,3)
CEE 6570 Biological Processes	(S,3)
CEE 6590 Environmental Organic Chemistry	(S,3)
CEE 6726 3D Printing Parts that Don't Break: From Processing to Performance	(S,3)
* CEE 7740 Advanced Structural Concrete	(S,3)
CHEME 6610 Air Pollution Control	(S,3)
ENMGT 5960 Negotiations and Contract for Engineering Managers	(S,3)
* MSE 5150 Structures and Materials for Sustainable Energy Systems	(S,3)
MSE 5550 Introduction to Composite Materials	(S,3)

Petitions for Major Approved Electives and Design Courses

In addition, in consultation with their advisors, students may petition for other upper level (≥ 4000) CEE courses to be considered to meet the Design or Major-Approved Electives. Students are also able to petition for other courses outside the major to count towards a Major-Approved Elective if it is a technical course, which has either a technical prerequisite beyond the common curriculum, or an advanced standing (4000 level or above and is limited to Juniors or above).

Additional Science Requirement

Students must complete an additional science course. The requirement for “one additional area of basic science” reflects ASCE’s intent that civil engineering graduates develop greater breadth in the basic sciences beyond the technical core subjects of physics and chemistry. Some possible additional areas of study include other natural sciences (e.g., life, earth and space sciences), and geo-spatial representation – areas of significant interest and increasing importance for civil engineers. This requirement can be met in one of several ways:

- Using credit for AP Biology,
- Taking an approved science course as an Advisor-Approved Elective
- Using a science course as the replacement when a CE core curriculum course (ENGRD 3200 or ENGRD 2510) to meet the 2nd distribution requirement.
- Taking an approved science course as an additional course.

A list of approved science courses appears below. Students may also petition to have other courses approved.

BIOG 1440 Comparative Physiology	(F, S, Su, 3)
BIOMG 1350 Cell and Developmental Biology	(F, S, SU, 3)
BIOEE 1610 Ecology and the Environment	(F, S, Su, 3-4)
EAS 1540 Introductory Oceanography	(F, 3)
EAS 2250 The Earth System	(F, 4)
EAS 3030 Introduction to Biogeochemistry	(F, 4)
EAS 3050 Climate Dynamics	(F, 3)
EAS 3410 Atmospheric Thermodynamics and Hydrostatics	(F, 3)
EAS 3420 Atmospheric Dynamics	(S, 3)
EAS 3530 Physical Oceanography	(S, 3)

On the next page is a flow chart illustrating the broad-based Civil Major. Please be aware that the flow charts are meant to depict **a typical way of arranging curriculum rather than a strictly rigid sequence of courses**. There are many valid ways for students to work out their course sequence in consultation with their faculty advisor or the Associate Director of CEE. A number of suggested possible programs for focused study within the Civil Major are presented in section IV along with their respective flow charts.

Definitions for Major Approved Elective & Design:

Major Approved Elective (MAE):

We will accept as a Major Approved Elective (MAE) a technical engineering course which:

- a. Appears on the published list of courses pre-approved as MAEs.
 - b. Has a technical prerequisite beyond the common curriculum, or
 - c. Has an advanced standing (4000 level or above and is limited to Juniors or above)
- To be approved as an MAE, a course should have a specific rubric for grading and an outline of the assignments used for evaluation of student work.

CEE Design Electives:

We will accept as a Design course a technical engineering course which:

- a. Appears on the published list of courses pre-approved as CE Design courses,
- b. Is offered by another unit in the College of Engineering, and has been designated as a design course in that department.

To be approved as a design elective, a course should:

- a. Be a 3 or 4 credit technical engineering courses that include evidence of at least 2 credits of design.
- b. Be based upon the knowledge and skills acquired in earlier coursework,
- c. Incorporate appropriate engineering standards,
- d. Incorporate multiple design constraints,
- e. Include principles of sustainability in design,
- f. Include consideration of an open-ended aspect of the problem with at least one iteration of review and improvement in the design.

Courses offered within the College of Engineering, but not clearly designated as design can be considered if the supervising faculty member provides:

- a. A clear statement describing the design content of the course,
- b. What will be expected of the student,
- c. How the design activity will be evaluated. This typically involves a report that can be used as documentation of the design component.

Documentation should be included in the student's folder to support the approval of the course as meeting the design requirement.

Capstone Design

In addition to the criteria for a design course listed above, a capstone design course should also:

- a. Encompass design of a system, component, or process in at least two civil engineering contexts, and
- b. Include multiple iterations of review and improvement in the design of open-ended aspects of the problem

Only pre-approved courses will be allowed for CE Capstone Design.

Civil Engineering Major (CE)

a Must take one additional basic science course. This course may simultaneously satisfy another requirement such as advisor approved elective. Courses meeting that requirement are: BIOG 1440, BIOPE 1610, BIOMG 1350, EAS 2200, 3030, 3050, 3410, 3420, and 3530.

b ENGRD 2610 is strongly recommended for Infrastructure, ENGRD 2110 for transportation, and ENGRD 2210 for Fluid Mechanics/Hydrology/Water Resources.

c May substitute CHFM 2080 or CHEM 1570 for PHYS 2214.

d Students taking BEE 2510, ENGRD 3200 or CEE 3040 as the 2nd distribution course must take an additional Major-approved elective.

e MAE 2030 (S) may be taken in the second year; CEE 4780 (S) should not be taken until the third or fourth year. Note that MATH 2940 is a co-requisite for CEE 4780.

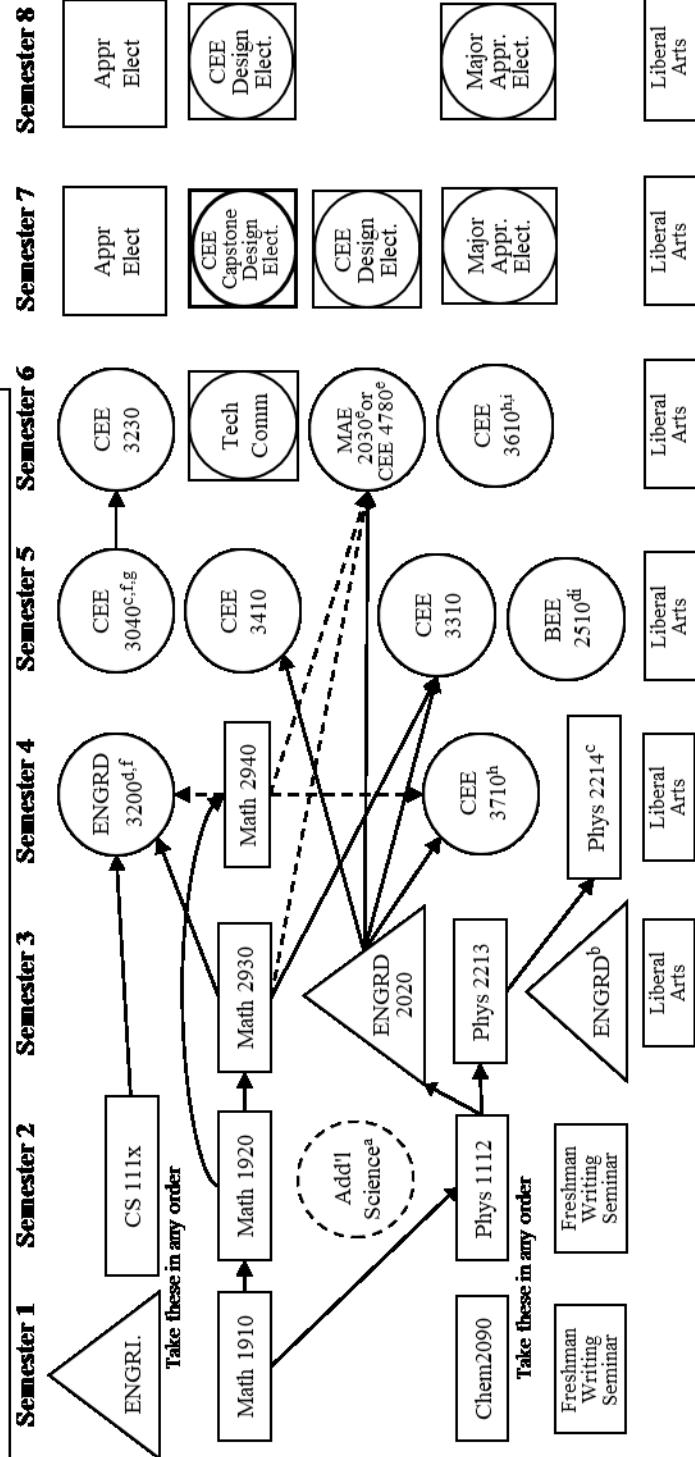
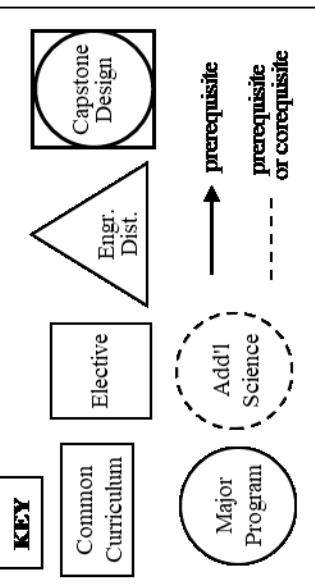
f ENGRD 3200 (S) may be taken in semesters 4 or 6

g ENGRD 2700 may be accepted (by petition) to substitute for CEE 3040 if taken prior to affiliation in the Major or if necessary because of scheduling conflicts.

h Students may take 3610 or 3710 in Semester 4, depending on their interests.

i May substitute CEE 3720 for either BEE 2510 or CEE 3610 if one takes either CEE 4730 or 4740. However, CEE 3720 then counts as a Core Course only and not as one of the five CEE Design Courses or Major-Approved Electives.

j If the technical communication requirement is met with a course that fulfills another requirement, then an additional advisor approved elective is required.



IV. Suggestions for Program Focused Study within the Civil Major

While it is not necessary to do so, many students choose to emphasize one or two of the different areas within the Civil Major. The following is a guide for those students who wish to focus on a particular area within the general major of civil engineering. **The flow charts presented are meant to be *sample curricula* rather than strictly defined sequences of courses.** Students have great flexibility in working out their focus with their faculty advisor. Please know that neither the School nor the College formally recognizes these focuses.

Focus on Civil Infrastructure

This focus area considers structural form and the mechanics of engineering materials to design and analyze structures using both modern computing and engineering know-how. Civil infrastructure encompasses the physical components that comprise our cities, transportation networks, and public utilities such as water and electrical distribution systems. Structures range from buildings, bridges, towers, and roads, to tunnels, dams, aqueducts, pipelines, and space stations. The Civil Infrastructure concentration includes the mechanics of materials ranging from steel and concrete to 3D printed parts and composite systems. Courses include the dynamics of structures, the behavior of materials, the management of building operations, and the mechanics that underpin how structures carry loads, deform, and fail. Students interested in this area often take:

Suggested Design and Major-Approved Electives (Design courses are designated by an asterisk; Capstone Design courses are shown in **bold** type.)

Fall Courses		credits
CEE 4725	Intermediate Solid Mechanics	4
CEE 4730*	Design of Concrete Structures	4
CEE 4770	Natural Hazards, Reliability, and Insurance	3
MAE 4700	Finite Element Analysis for Mechanical & Aerospace Design	3
CEE 5740	Intermediate Behavior of Metal Structures	3
CEE 5735	Mathematical Modeling of Natural and Engineering Systems	3

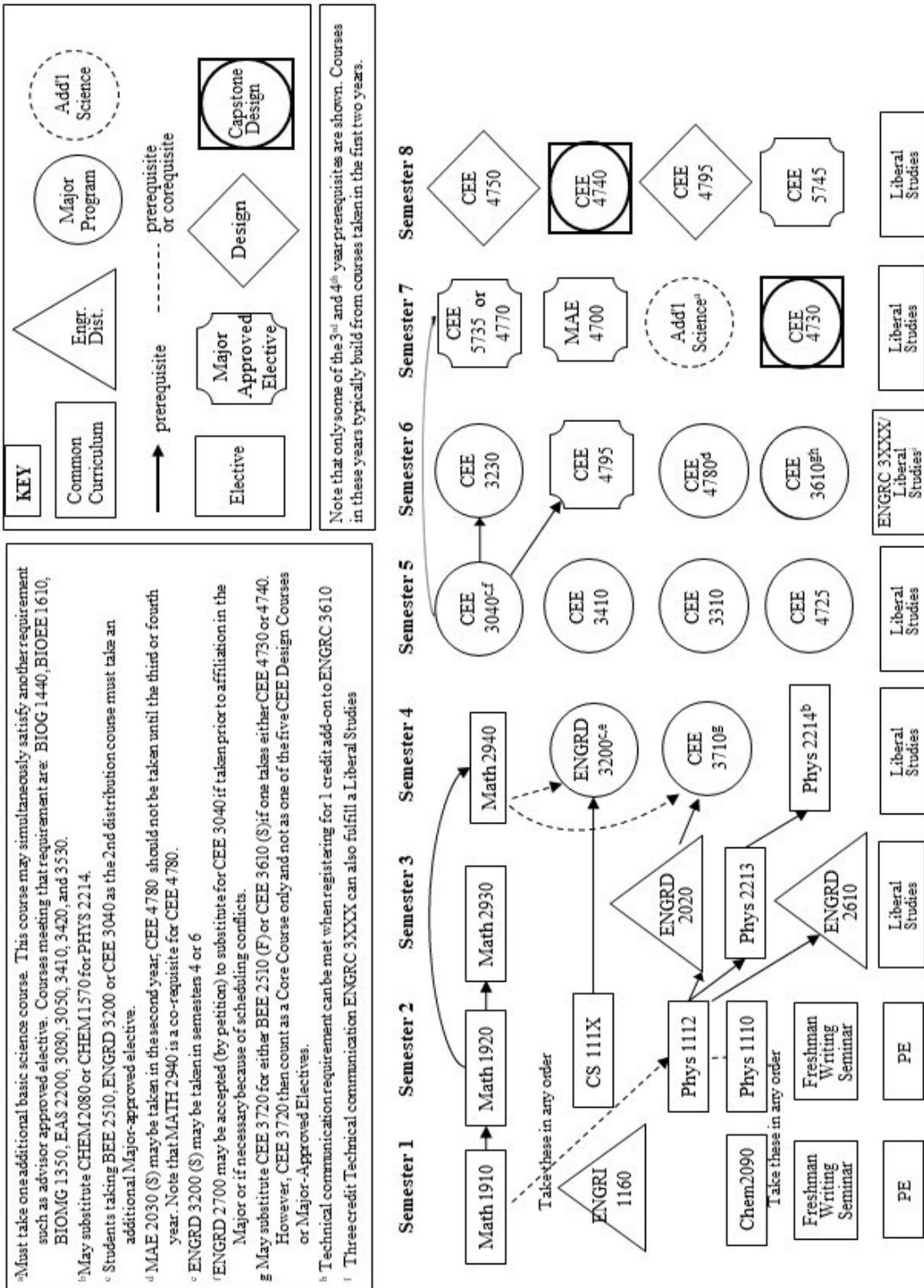
Spring Courses		credits
CEE 4750*	Concrete Materials and Construction	3
CEE 4740*	Introduction to the Behavior of Metal Structures	4
CEE 4795*	Sensors for the Built and Natural Environment	3
MSE 5150*	Structures and Materials for Sustainable Energy Systems	3
CEE 5745	Inverse Problems: Theory and Application	3

(Note that students may substitute CEE 4725 for either BEE 2510 or CEE 3610, if they also complete either CEE 4730 or CEE 4740. However, CEE 4725 then counts as a Core Course only and not as a Major-Approved Elective.)

A flow chart showing a sample focus in **civil infrastructure** is given on the following page. Please be aware that the flow chart is meant to depict a typical way of arranging curriculum rather than a strictly rigid sequence of courses. There are many valid ways for students to work out their course sequence in consultation with their faculty advisor or the Associate Director of CEE.

Roadmap for Civil Infrastructure Concentration

- ^aMust take one additional basic science course. This course may simultaneously satisfy another requirement such as advisor approved elective. Courses meeting that requirement are: BIOLG 1440, BIOEE 1610, BIOMG 1350, EAS 2200, 3050, 3410, 3420, and 3530.
- ^bMay substitute CHEM 2080 or CHEM 1570 for PHYS 2214.
- ^cStudents taking BEE 2510, ENGRD 3200 or CEE 3040 as the 2nd distribution course must take an additional Major-approved elective.
- ^dMAE 2030 (S) may be taken in the second year; CEE 4780 should not be taken until the third or fourth year. Note that MATH 2940 is a co-requisite for CEE 4780.
- ^eENGRD 3200 (S) may be taken in semesters 4 or 6 (ENGRD 2700 may be accepted (by petition) to substitute for CEE 3040 if taken prior to affiliation in the Major or if necessary because of scheduling conflicts.
- ^fMay substitute CEE 3720 for either BEE 2510 (F) or CEE 3610 (S) if one takes either CEE 4730 or 4740. However, CEE 3720 then counts as a Core Course only and not as one of the five CEE Design Courses or Major-Approved Electives.
- ^gTechnical communication requirement can be met when registering for 1 credit add-on to ENGRC 3610
- ^hThree credit Technical communication ENGRC 3XXX can also fulfill a Liberal Studies or Major-Approved Electives.



Focus on Fluid Mechanics, Hydrology, and Water Resources

Students with a strong interest in fluid mechanics, hydrology and water resources may take a diverse set of courses in that area while meeting the requirements for the degree in Civil Engineering. Students with a primary interest in Environmental Engineering may want to consider a similar path within the Environmental Engineering Major

Design and Major-Approved Elective courses that can be incorporated in a broad-based Civil Major are listed below. For example, CEE 3310 *Fluid Mechanics* and BEE 2510 *Engineering Processes for Environmental Sustainability* are core courses to which can be added BEE 4750 *Environmental Systems Analysis*, which provide introductions to hydraulics and environmental systems topics. Interested students should consider courses on the following list and one of which must be a "capstone" course (designated by **bold** type) (Design Courses are designated by an asterisk):

Suggested Design and Major-Approved Electives (Design courses are designated by an asterisk;
Capstone Design courses are shown in **bold** type.)

Fall Courses

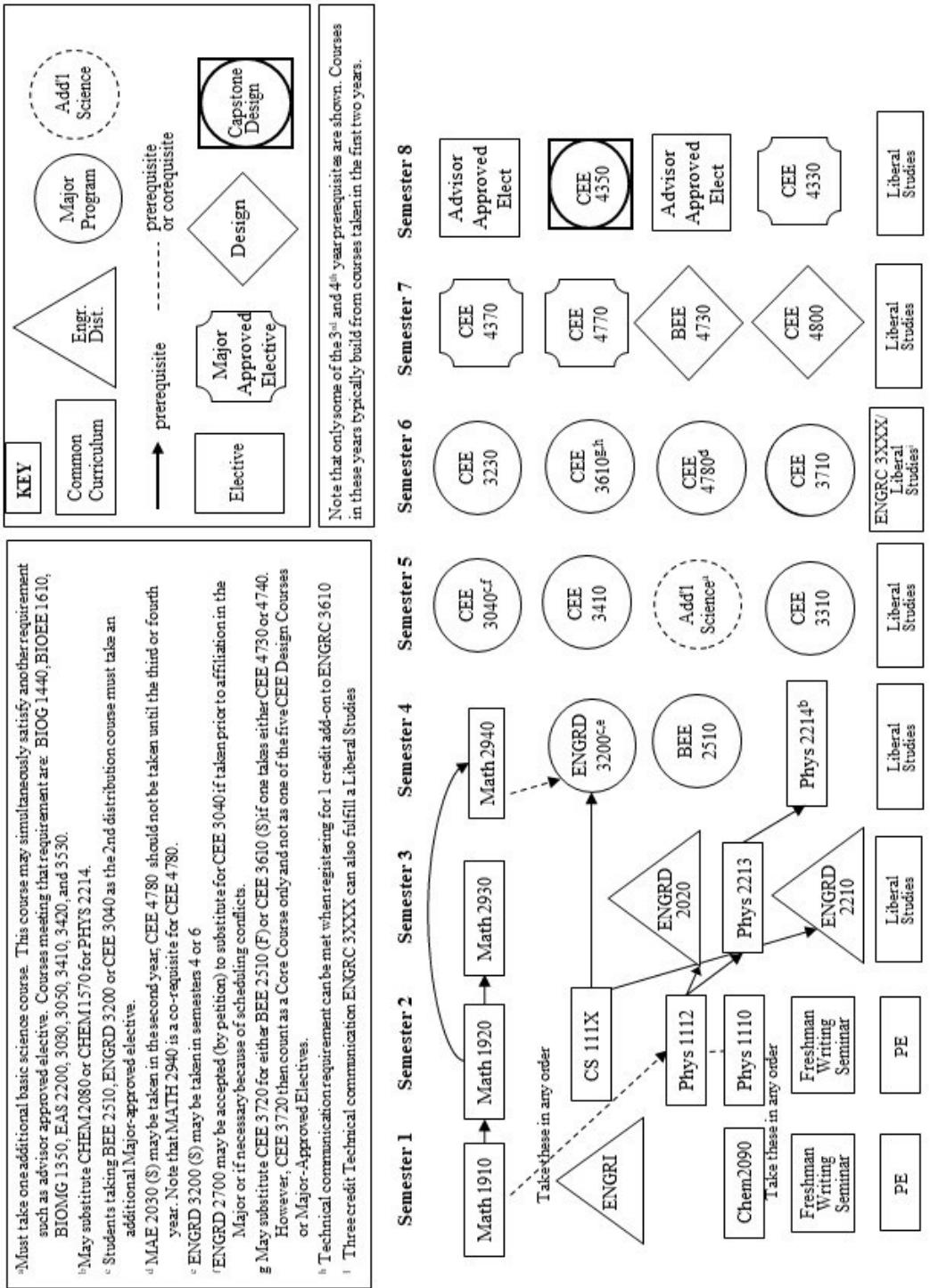
CEE 6100 Remote Sensing Fundamentals	(F,3)
* BEE 4730 Watershed Engineering	(F,3)
BEE 4750 Environmental Systems Analysis	(F,3)
CEE 4370 Experimental Methods in Fluid Dynamics	(F,4)

Spring Courses

CEE 4370 Experimental Methods in Fluid Dynamics	(S,3)
CEE 6550 Transport, Mixing, and Transformation in the Environment	(S,3)
* BEE 4760 Solid Waste Engineering	(S,3)
CEE 4330 Physical Hydrology in the Built and Natural Environments	(S,4)
* CEE 4565 Waste Water Prosses and Resource Recovery	(S,4)

A flow chart showing a sample focus in **fluid mechanics, hydrology, and water resource systems engineering** is given on the following page. Please be aware that the flow chart is meant to depict a typical way of arranging curriculum rather than a strictly rigid sequence of courses.

Fluid Mechanics, Hydrology, and Water Resource Concentration



Focus on Transportation and Systems

This focus area encompasses the planning, design and management of multimodal transportation systems, addressing a wide variety of challenges ranging from congestion to security to environmental impact. Transportation systems includes vehicles, network infrastructure and information technology, used both for monitoring and control, and to provide information to users of the system. The interactions of people with the system are especially complex and important. Study in transportation systems engineering often includes work in related areas such as economics, operations research, systems engineering, city and regional planning, and management. Students interested in transportation systems are encouraged (but not required) to take CEE 3610 in the spring of their sophomore year.

Suggested Design and Major-Approved Electives (Design courses are designated by an asterisk; Capstone Design courses are shown in **bold** type.)

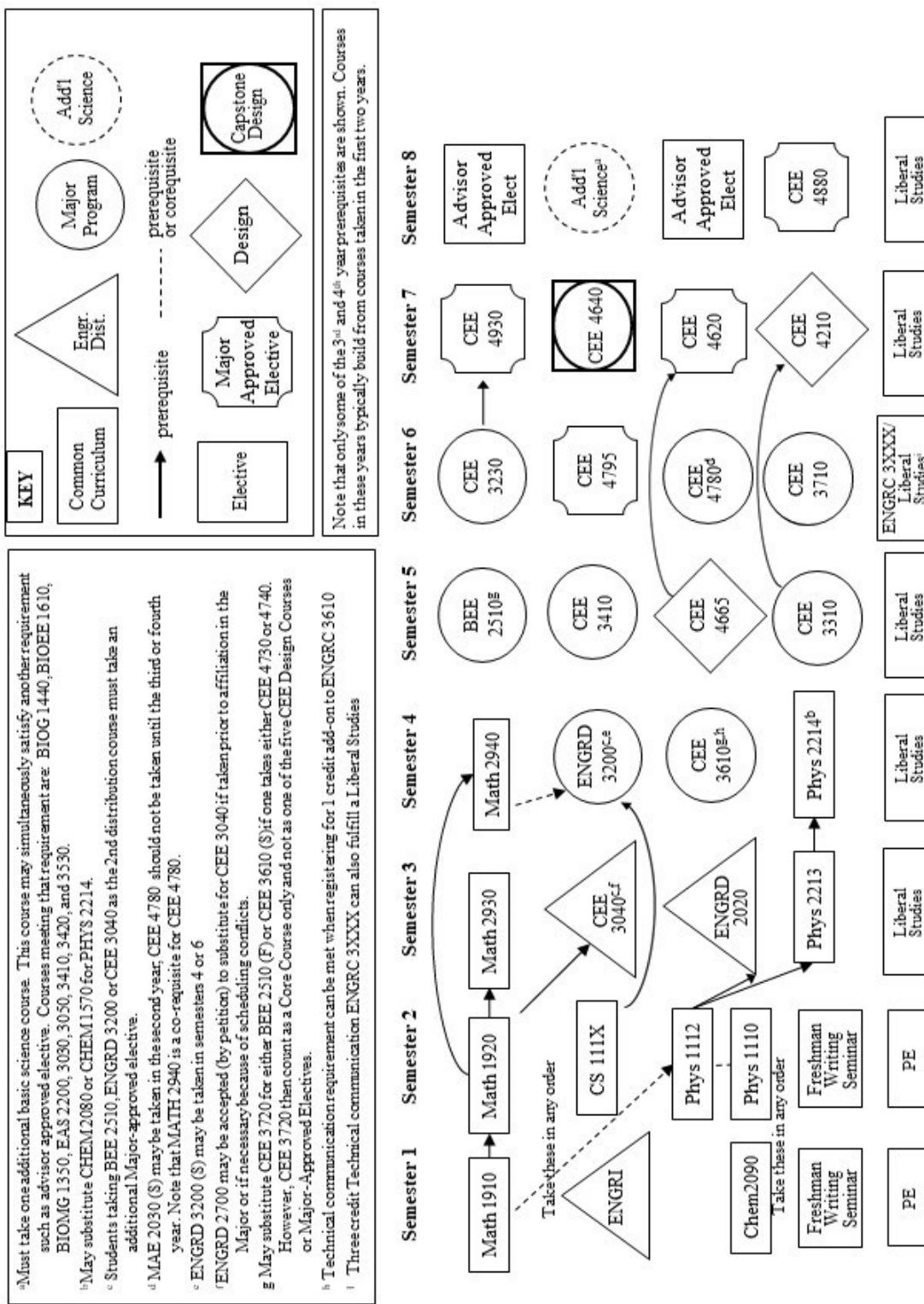
Fall Courses		credits
CEE 4210*	Renewable Energy Systems	3
CEE 4640*	Sustainable Transportation Systems	3
CEE 4930	Data Analytics	4
CEE 4620	Analysis and Control of Transportation Systems and Networks	3

Spring Courses		credits
CEE 4665*	Modelling and Optimization for Smart Infrastructure Systems	3
CEE 4880	Applied Modeling in Renewable Energy	3

Courses from Operations Research & Industrial Engineering can also be used as Major-Approved Electives (by petition). Selection should be done in consultation with your advisor and get the approval of the Undergraduate Director. Additional electives that can be very useful to students interested in transportation engineering include courses in City and Regional Planning or Economics. Some of these courses may be used to fulfill Liberal Studies requirements.

A flow chart showing a sample program emphasizing **transportation systems** is given on the following page. Please be aware that the flow chart is meant to depict a possible way of arranging curriculum rather than a strictly rigid sequence of courses. There are many valid ways for students to complete their course sequence in consultation with their faculty advisor or the Associate Director of CEE.

Roadmap for Transportation and Systems Concentration



Focus on Smart Cities

The Smart Cities focus area realizes the growing ubiquity of sensors, smart devices, real-time data and advancements in artificial intelligence in civil and environmental engineering. The area will appeal to those interested in best using data to design, analyze, and control smart, interconnected, and dynamic infrastructure systems, e.g. the smart buildings, smart energy grids, smart water systems, and smart transportation systems that will grow to define the future.

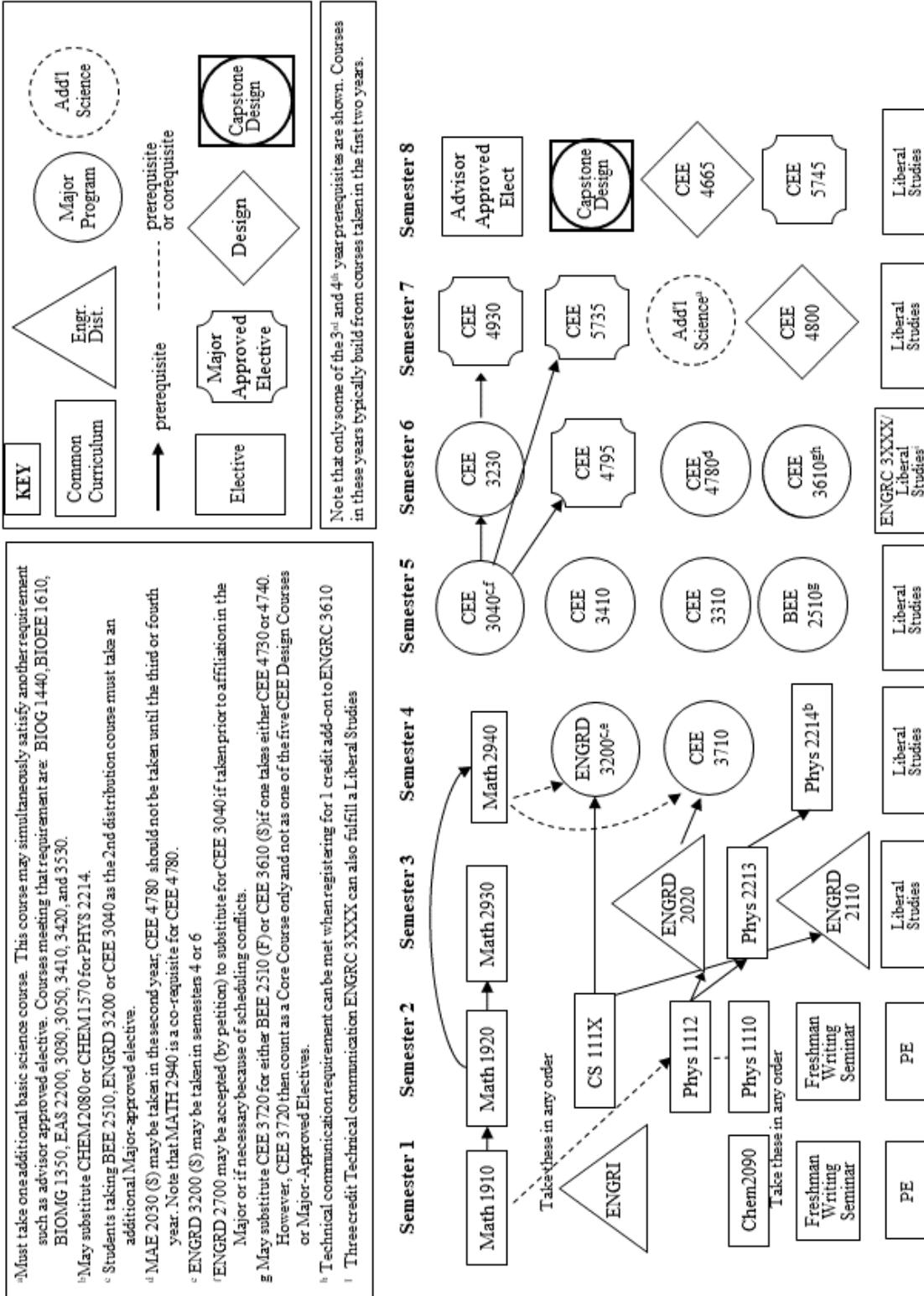
Suggested Design and Major-Approved Electives (Design courses are designated by an asterisk)

Fall Courses		credits
CEE 4800*	Engineering Smart Cities	3
CEE 4930	Data Analytics	4
CEE 5735	Mathematical Modelling of Natural and Engineered Systems	3

Spring Courses		credits
CEE 4665*	Modelling and Optimization for Smart Infrastructure Systems	3
CEE 4795*	Sensors for the Built and Natural Environment	3
CEE 5745	Inverse Problems: Theory and Applications	3

A flow chart showing a sample program emphasizing smart cities is given on the following page. Please be aware that the flow chart is meant to depict a possible way of arranging curriculum rather than a strictly rigid sequence of courses. There are many valid ways for students to complete their course sequence in consultation with their faculty advisor or the Associate Director of CEE.

Roadmap for Smart Cities Concentration



Focus on Environment

This focus area encompasses water, the environment, energy, and the creation of new solutions for evolving environmental challenges. Courses in this focus area span the water-energy nexus, including sustainable water supply and sustainable energy. More traditional topics include hydrology, water quality engineering, environmental remediation, and waste management. The environmental engineering focus area also includes the study of the movement of pollutants through the environment, via environmental fluid mechanics, environmental transport processes, experimental methods and monitoring, and numerical methods and modeling. The Civil Engineering Major allow students to focus on environmental engineering while receiving general training in cores areas of Civil Engineering. A separate major leading to a B.S. degree in Environmental Engineering exists for students who would like to focus only on that field.

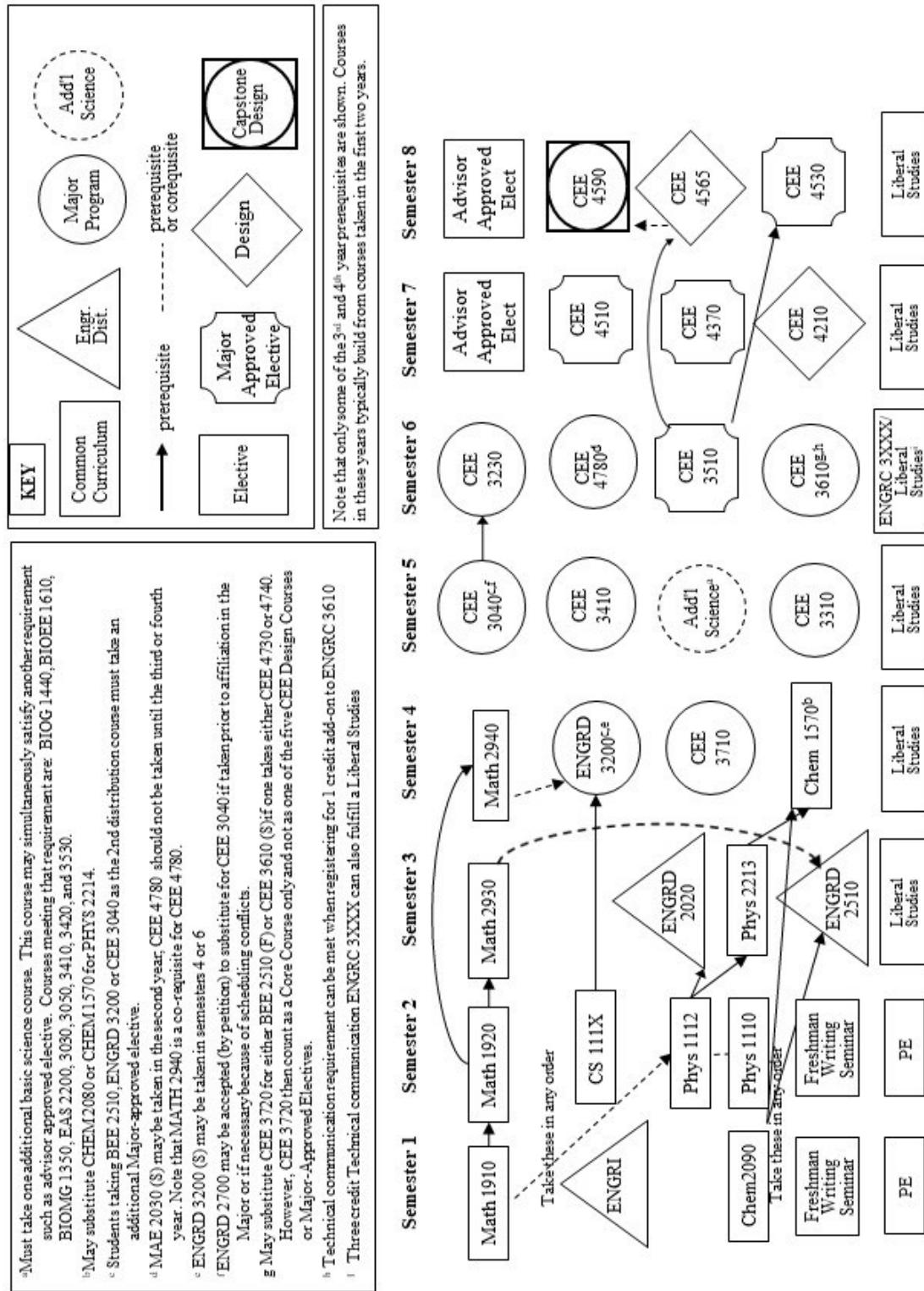
Suggested Design and Major-Approved Electives (Design courses are designated by an asterisk; Capstone Design courses are shown in **bold** type.)

Fall Courses		credits
BEE 4730*	Watershed Engineering	4
BEE 4750	Environmental Systems Analysis	3
BEE 4270*	Water Measurement and Analysis	3
CEE 4210*	Renewable Energy Systems	3
CEE 4370	Experimental Methods in Fluid Dynamics	4
CEE 4510	Microbiology for Environmental Engineering	3
EAS 4570	Atmospheric Air Pollution	3

Spring Courses		credits
BEE 3710	Physical Hydrology for Ecosystems	3
BEE 4710	Introduction to Groundwater	3
BEE 4760	Solid Waste Engineering	3
CEE 3510	Environmental Quality Engineering	3
CEE 4330	Physical Hydrology in the Built and Natural Environment	3
CEE 4350*	Coastal Engineering (every other year)	4
CEE 4530	Laboratory Research in Environmental Engineering	3
CEE 4565*	Waste Water Processes and Resources Recovery	3
CEE 4590*	Sustainable Environmental Technology for Remediation and Resources Recovery	3
CEE 4795*	Sensors for the Built and Natural Environment	3
CEE 4880	Applied Modeling in Renewable Energy	3
CEE 5420	Energy Technologies and Subsurface Resources	3

A flow chart showing a sample program focusing on the environment is given on the following page. Please be aware that the flow chart is meant to depict a possible way of arranging curriculum rather than a strictly rigid sequence of courses. There are many valid ways for students to work out their course sequence in consultation with their faculty advisor or the Associate Director of CEE.

Roadmap for Environment Concentration



V. Academic Policies and Procedures

The Associate Director for the School of Civil and Environmental Engineering, Prof. Derek Warner (in 221 Hollister Hall) is responsible for the administration of the undergraduate curriculum. His office coordinates the assignment of advisors, registration procedures, transfer credit awards, action on internal petitions, academic actions for affiliated students, and auditing of records for graduation. The Associate Director is assisted by an Undergraduate Major Coordinator, Mrs. Laura Ricciuti, also in 221 Hollister.

More detailed information on the policies and procedures of the University and of the College of Engineering may be found in the [Courses of Study](#), and in [The Engineering Undergraduate Handbook](#), available from the College of Engineering Advising Office, 180 Rhodes Hall.

Advising

Students who affiliate with CEE will have a CEE faculty advisor. A student's advisor is available for assistance with course pre-registration, answering questions, and for helping with finding assistance. ***The signature of the assigned advisor is required on the forms for course selections, course changes, S/U grading options, and petitions.*** In an emergency, if the student's advisor is not available, the Associate Director or Director can act as a substitute. A student is required to make every effort to meet with his/her advisor as early as possible during the pre-enrollment period.

Good-Standing Status

Undergraduates in the School of Civil and Environmental Engineering are in *Good Standing* if they are making acceptable progress toward completion of the requirements for graduation. Acceptable progress in CEE is defined as meeting the following requirements:

- a) Semester GPA ≥ 2.0
- b) Cumulative GPA ≥ 2.0
- c) * A term GPA ≥ 2.0 in Core Courses, Design Courses, Major-approved Electives, and Engineering Distribution Courses (Tech GPA).
- d) **No failing grades**
- e) Passing at least 12 credit hours each semester.
- f) * Cumulatively no more than one grade below C- in required Core courses, Design courses, Major approved electives, and Engineering distribution courses.

*Grade(s) below C- in these courses beyond the first will require that the course(s) so graded be repeated. (The College of Engineering also requires that each course in the required mathematics sequence - 1910, 1920, 2930, 2940 - be passed with a grade of C- or better.)

Students who fail to maintain good-standing status may be warned, required to take a leave of absence for one or more terms, or required to withdraw. The specific action in each case is based upon the pertinent circumstances as well as the student's previous academic record.

CEE's policy about academic action procedures provides for two separate reviews of the student's record by the School's Committee on Academic Standards, Petitions and Credits (CASPAC). The first review is to identify those students who have not made satisfactory progress during the term and second is to assign academic actions when deemed appropriate. Students who receive actions are notified by letter sent to their email addresses. This letter includes a request for information about possible extenuating circumstances and an invitation to appeal the committee's action. Appeals must be in writing. If an appeal is made, CASPAC will review the appeal and decide whether to reconsider its decision.

Petitions

Cornell University has a tradition of considering petitions from students relative to special situations or circumstances that may well justify exceptions to the normal rules or requirements. All petitions from CEE students should be discussed with their academic advisor and then submitted to the Associate Director of the CEE School. If the matter is one over which the College, rather than the School, has jurisdiction, the Associate Director will forward the petition to the College. The appropriate College or School committee considers petitions on a case-by-case basis.

S/U Grading Option

CEE students may enroll S/U in only one course each semester in which the choice between letter grade and S/U is an option, and *only* Liberal Studies Distribution courses or Advisor Approved Electives may be taken this way (Note: Major-Approved Electives and the Technical Communication course may not be taken S/U). Additional courses offered S/U only may be taken in the same semester. No more than 15 S/U optional credits will count toward a student's degree requirement. Note that courses graded S/U do not count in eligibility for the Dean's List.

Transfer Credit

After matriculation in the College, a student may transfer no more than 18 credits without petitioning for special circumstances. Transfer students may not transfer more than 72 credits, regardless of when or where the credits were earned. Cornell does not grant transfer credit for courses in which a student earned a grade less than C. Summer session courses taken at Cornell are not considered transfer credits.

Student Responsibilities

Each undergraduate enrolled in the School of Civil and Environmental Engineering is responsible for the timely selection, registration for, and completion of appropriate courses in each of the several categories needed to fulfill the requirements of the curriculum of the School and the College of Engineering. A student's failure to discharge these responsibilities in a timely manner can result in a delay in graduation and/or incorrect entries on their transcript.

Students should check the Undergraduate Bulletin Board (between rooms 221 and 223 Hollister) regularly. This board will contain important information concerning events of particular interest to undergraduates.

Official University Transcripts

The University offers free official transcripts from the Office of the University Registrar in-person: B7 Day Hall; Fax: (607) 255-6262; <http://transcript.cornell.edu/>; transcripts can be ordered online. If you need an official transcript, plan to obtain it well before the date needed in case there is a technical problem that would prevent the Registrar from processing your request. The Office of the University Registrar is the only office that can issue an official transcript.

Student Progress Reports

The progress of each student toward completion of degree requirements is charted on a Progress Report. (An example Progress Report appears on the next page.) Courses that have been completed are shown in their appropriate categories on this record. Each student is encouraged to examine his/her Progress Report carefully and to report errors and desired adjustments to the Undergraduate Program Coordinator in 221 Hollister. It is important that the record be complete and accurate, because it is used by the CEE School to determine a student's eligibility for graduation.

A copy of each student's Progress Report is provided to the student and to his/her advisor whenever significant updates or changes are made. Students can download their progress report from [Cornell Box](#) or by emailing lr482@cornell.edu.

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Civil Engineering Major Progress Report
For the Class of 2022 and later

Name:

Advisor:

Date: 8/1/2017

VI. Student Support Services

Having problems managing your workload or your time? Have you been sleeping more but still feel tired all the time? Having problems getting out of bed and getting motivated? Each year, many students in the College and the University find that they are having problems academically, socially, and/or personally. Deciding how you respond to these obstacles can profoundly affect your level of success at Cornell.

Cornell offers several resources to help students who are having problems academically:

Biology Advising Center

8am-4:30pm Monday-Thursday; 8am-4pm Friday; 216 Stimson Hall

Tel: (607) 255-5233; Fax: (607) 255-0470; Email: bioadvising@cornell.edu

www.bio.cornell.edu/advising

Engineering Advising Office

8:00am-4:30pm; 167 Olin Hall

Tel: (607) 255-7414; Fax: (607) 255-9297; Email: adv_engineering@cornell.edu

<http://www.engineering.cornell.edu/resources/advising/index.cfm>

Learning Strategies Center

8:30am-4:30pm Monday-Thursday; 8:30-4pm Friday; 420 Computing and Communications Center

Tel: (607) 255-6310; Email: cornell-clt@cornell.edu

<http://lsc.cornell.edu/>

Math Support Center

Open during Academic Year see website for specific hours; 256 Malott Hall

Tel: (607) 255-4658; Email: mst1@cornell.edu

<http://www.math.cornell.edu/msc/>

Writing Walk-in Service

8:30am-5:00pm Monday-Friday – see website to schedule an appointment and locations; 174
Rockefeller Hall

Tel: (607) 255-6349; Fax: (607) 255-4010

<http://knight.as.cornell.edu/tutoring>

Minority & Women's Programs in Engineering

8:00am-4:30pm; 146 Olin Hall

Tel: (607) 255-7514; Email: dpeng@cornell.edu

<http://www.engineering.cornell.edu/diversity/>

Mental Wellness Support

Sometimes obstacles aren't rooted in study habits but in medical or psychological problems. These range from low iron or blood sugar to depression or anxiety. For many students this is the first time they are living away from home and are responsible for their own well-being. Although many people see you each day and may genuinely care about you, no one is making sure that you are eating well, getting regular exercise, and are healthy. Indeed, it is less likely that people will recognize if you're facing some minor or major emotional problem, especially if you are living off-campus. It is important that you care for yourself, and ask for help and direction from your Resident Advisor, faculty advisor, or other campus or community office/agency.

Cornell offers mental wellness support to students through the following services, among others:

CAPS (Counseling and Psychological Services) at Cornell Health;

Tel: (607) 255-5208 or (607) 255-5155; Email: gannett@cornell.edu

<https://health.cornell.edu/services/counseling-psychiatry>

CAPS has noted a trend that engineering students tend to wait a long time before they seek assistance. This behavior results from the—usually mistaken—belief that the problem solving skills of engineers extend to emotional and psychological issues. Failure to seek help usually ends up putting the student in more academic and personal risk. If you are really stressed, tired all the time, having trouble getting yourself to class, not able to complete assignments on time, confused about life in general, sad, anxious, or just want someone to talk to so you can decompress, contact CAPS. Often times just talking with a trained professional can help you feel better. Note: each student is limited to 12 individual counseling sessions per year.

EARS (Empathy and Referral Service);

Tel: (607) 255-3277

<http://orgsync.rso.cornell.edu/org/ears>

Free and confidential.

Suicide Prevention and Crisis Service;

Tel: (607) 272-1616

<https://health.cornell.edu/resources/health-topics/suicide>

Free and confidential.

General Medical Problems

Gannett Health Center;

Tel: (607) 255-5155;

<https://health.cornell.edu/>

If you've had a lingering health concern, please have it checked out. Even minor illnesses can detract from your overall enjoyment of 'the college experience'.

VII. CEE Student Activities

There are five principal student organizations in the School of Civil and Environmental Engineering: the American Society of Civil Engineers (ASCE) , Chi Epsilon and Aguacela, EERI and Engineers for a Sustainable World (ESW).

American Society for Civil Engineers (ASCE)

Membership in the Cornell Student Chapter of the American Society of Civil Engineers (ASCE) is one of the best bargains you will find. In 1983 and 1991 our ASCE student chapter was named the most outstanding ASCE Chapter in the U.S. The Chapter also received a Letter of Honorable Mention for meritorious activities during 1987, and a Certificate of Commendation from the National ASCE headquarters in 1979, 1982, 1984, 1985, 1992, 1996 through 2000, and again in 2002. In 2001, the Chapter was the Ridgeway Award Finalist for Zone I and won an Outstanding Community Service Award. The ASCE Student Chapter gets involved in a large variety of activities, both professional and social, including many community service projects; a fall picnic for all students, faculty, and staff; participation in the Upstate New York Regional Conference (including the Steel Bridge Competition); hosting the two competitions in 1993, 1999, and 2007; participation in a wide variety of intramural sports; and a Spring Picnic. The Picnic has become a Cornell CEE tradition.

Watch for announcements of joint meetings with the Ithaca Section of ASCE, where you will get a chance to meet practicing engineers, enjoy a good dinner, and hear a talk on civil and environmental engineering. Jerry Stedinger (HLS 213) and Peter Diamessis (HLS 105) are the Faculty Advisors.

Website: <https://www.cee.cornell.edu/cee/resources/student-organizations>

Chi Epsilon

Chi Epsilon is the Civil Engineering Honor Society with chapters at most CE Schools in the U.S. Membership in Chi Epsilon is by election and is based on academic standing. Chi Epsilon at Cornell is very active and sponsors many activities and holds elections each spring for the "Professor of the Year" award. The award is presented to a CEE Faculty member for outstanding performance in teaching.

Website: <https://www.cee.cornell.edu/cee/resources/student-organizations>

Aguacela

Aguacela is a project in Civil and Environmental Engineering at Cornell University that is improving drinking water quality through innovative research, knowledge transfer, open source engineering and design of sustainable, replicable water treatment systems. The Aguacela project continues Ezra Cornell's vision: his sense of invention, his focus on the future, his belief in hands-on learning, his dream of a well-rounded education available to anyone. The Aguacela team conducts drinking water treatment research in our laboratory and in our pilot scale facility located in the Cornell University Water Filtration Plant. The team designs hydraulic powered drinking water treatment plants using an automated design tool. The designs are built by partner organizations in Honduras, but with the full expectation that the technology will be spreading to other countries in the next few years. Aguacela water treatment plants built in Honduras were serving 13,000 people as of the summer of 2008. Students can join the Aguacela team by taking CEE 2550, CEE 4540, and CEE 4550. The Aguacela team takes a 2-week project trip during the January intersession. There are also opportunities for summer internships at Cornell and in Honduras and for yearlong internships in Honduras after graduation.

Website: <http://aguacela.cee.cornell.edu>

Seismic Design at Cornell

The Seismic Design Team designs, builds, and tests a scaled multi-story balsa wood tower for an international undergraduate competition hosted every spring at the Earthquake Engineering Research Institute's (EERI) annual meeting. At competition, the tower is scored on a number of categories including architecture, model predictions, building revenue and costs, team presentations, and most importantly whether or not the structure survives all three ground motions. Our team offers a great opportunity for students interested in all engineering disciplines, especially those focused in construction, structures, architecture, seismology and more, to experience the process of bringing a project from an abstract thought to a tangible product. On our cohesive team, students have ample opportunities to experience hands-on construction, learn several different applicable software, use a laser cutter, acquire leadership positions, and above all, make a substantial impact on the final building!

The team was founded in 2013 by Victoria Rhodes '13 and has made great strides over the past few years improving its tower each year. We look forward to continuing improvements and successes! If you have any questions or would like more information, please email cornellseismicdesignteam@gmail.com .

Website: <http://blogs.cornell.edu/seismicdesignteam/>

Engineers for a Sustainable World (ESW)

Engineers for a Sustainable World (ESW) strives to increase awareness of sustainability issues and to integrate sustainable engineering systems into the global and local communities. We envision a world of environmental, social, and economic prosperity created and sustained by local and global collective action. We have four main project teams: Human Powered Electricity Generator, Solar Ovens, Solar Kiosk, and Biofuels. Each team requires members to research, design, and implement a sustainable engineering system using a different form of alternative energy.

Website: <https://eswbiofuels.engineering.cornell.edu/>

VIII. Employment: Summer and Permanent

There is a wide array of summer and post-graduate opportunities available to civil and environmental engineers. Employers include private consulting firms; industrial firms of all types (including aerospace and manufacturing); governmental agencies at the local, state and national level; construction firms; and research and development groups. Developing countries have a very strong need for civil and environmental engineers because the majority of their basic development needs fall within the domain of the civil and environmental engineer. Summer jobs in engineering are highly desirable; they provide experience in the "real world", giving new meaning to both previous and future coursework.

The **Engineering Career Center**; 201 Carpenter Hall; Tel: (607) 255-5006;
<https://www.engineering.cornell.edu/students/undergraduate-students/career-resources-undergraduates/about-career-center>. The Engineering Career Services Office has an extensive recruitment program with many interviewers coming to campus each year and maintains a searchable database of employment opportunities.

The **Cornell Career Services Office** has a series of special lectures on how to approach the job market, how to prepare résumés, and how to interview. The Cornell Career Services Office is located in 103 Barnes Hall; Tel: (607) 255-5221; Email: ccareer@cornell.edu ; <http://www.career.cornell.edu>

Participants in the Co-op Program (detailed on page **Error! Bookmark not defined.**) have the opportunity to evaluate prospective employers by working with a firm. This unique opportunity provides students with a valuable and engaging experience in their area of interest. Students typically start their Co-op assignment in their fifth semester and complete it the following summer.

Many of the best job opportunities are with private construction or consulting engineering companies, industries, and agencies that do not routinely interview on campuses because they are relatively small compared with the industrial "giants" that recruit large numbers of ME's, ECE's, ChemE's, etc. Eventually many CEE graduates own their own companies. The promise of personal satisfaction and financial gain from these types of positions is very high.

The ASCE student chapter arranges and hosts a number of company information sessions each year in which a representative from a CEE firm typically talks and answers questions not only about the firm but also about job opportunities and job-hunting strategies in general.

A resource file of available employment opportunities is maintained on our School's web site at:
<http://www.cee.cornell.edu/> simply click on *Resources*, then click on *Experience and Employment*, for all job information.

IX. Professional Registration

Engineers are licensed (after examination and if they also have suitable experience) to practice engineering in each state of the U.S. While not required for all CEE jobs, registration is important for civil and environmental engineers because they are responsible for public safety in much of their work. Most states and communities require that a registered engineer give final approval to all plans and specifications for engineering projects. Students can take the first step toward getting a Professional Engineering (PE) license while still a senior at Cornell. Students are eligible during their last semester to take Part A of the nationwide examination, the "Fundamentals of Engineering (FE) Examination." Successful completion earns the title "Intern Engineer" (often also called "Engineer-in-Training"). Because Part A emphasizes fundamental knowledge gained in engineering distribution courses and CEE Core courses, there is a comparative advantage in taking this exam during your last term. Please be sure to have the School notified of your exam results so that the School receives the feedback it needs to document the success of its graduates. Success or failure in this examination has no bearing on your academic standing at Cornell.

Information on how to apply for the Part A exam, which is given throughout the year in New York State (e.g., in Endicott, Syracuse, Albany, etc.) are available on-line at: <http://www.op.nysesd.gov/prof/pels/> or <http://nkees.org/exams/> and in the Undergraduate Program Office in 221 Hollister Hall. In preparation for the exam, students may enroll in BEE 5330 *Engineering Professionalism* for 1 credit during the Spring semester of their senior year.

Part B of the examination may be taken after four years of suitable engineering experience is achieved after passing Part A. Successful completion of Part B will give you the title "Professional Engineer" in the state where you took the Part B exam. With some exceptions registration in other states may usually be obtained by reciprocity rather than taking another exam.

See Appendix B in this handbook for more information on registration procedures in New York State and the specific requirements for registration, including requirements for education, examinations, and practical experience. Note that a bachelor's degree in engineering from an ABET-accredited university such as Cornell counts as eight years of "Education/Experience credit."

Details about the professional licensure application process is available on-line at
<http://www.op.nysesd.gov/prof/pels/>

X. Graduate Education

It's never too early to consider additional study beyond your Bachelor's degree. CEE averages about 140 graduate students, one of the largest graduate student enrollments at Cornell. For students who wish to continue their graduate program at Cornell, there are several options, as described below, leading to a Master of Engineering, Master of Science or a Doctor of Philosophy degree.

Master of Engineering Program

A report prepared by a task force of the American Society for Engineering Education (ASEE) recommended that baccalaureate students who plan to pursue careers in engineering practice be encouraged to complete, on a full-time basis, an advanced degree program focused upon engineering practice. Our School concurs and to provide students with sufficient meaningful and significant design experience CEE's solution has been the fifth-year Master of Engineering Program in either Civil and Environmental Engineering or Engineering Management. Professionally-oriented, the Master of Engineering degree programs are particularly popular for CEE seniors.

B.S. degree holders in engineering from Cornell who have a minimum grade point average of 2.7 are generally eligible for admission to either of the Master of Engineering programs outlined below. However, each application is evaluated individually, and the School reserves the right to make all admission decisions. To apply visit: www.gradschool.cornell.edu/

The Master of Engineering degree is a course work and project-oriented program. It is normally completed in two semesters of intensive study. Thirty credit hours consisting of course work in major and supporting areas and a project are required.

1. Master of Engineering (Civil and Environmental) Program

Master of Engineering students in Civil and Environmental Engineering may focus their studies in one of the following major subject areas: structural materials and mechanics, geotechnical engineering, environmental processes, environmental fluid mechanics and hydrology, environmental and water resource systems engineering, and transportation systems engineering. Each program typically consists of course work in a major concentration and supporting areas as well as a project. Some concentrations require a course in professional practice or management. Courses in supporting areas come from many disciplines, including microbiology, materials science, operations research, computer science, economics, architecture, historic preservation, and engineering management to name just a few.

2. Master of Engineering (Engineering Management) Program

The M.Eng. program in engineering management is aimed at engineers who want to stay in a technical environment, but focus on managerial roles. Students learn to identify problems, formulate and analyze models to understand these problems, and interpret the results of analyses for managerial action. Projects in the management area focus on integrating technical and economic analysis to create results that can support effective management decisions. Each student's program of study is designed individually in consultation with an academic adviser and then submitted to the Director of the Engineering Management Program for approval. Graduates of this program are in demand by civil engineering and construction firms, management consultants, industrial companies, and other organizations that focus on the efficient management of projects and technical systems.

Cooperative Programs with the Johnson Graduate School of Management

There are several special programs make it possible for students to earn degrees from both the College of Engineering and the Johnson Graduate School of Management in less time than if the degrees were pursued sequentially. The School of Civil and Environmental Engineering cooperates with the Johnson School programs leading to both Master of Engineering and Master of Business Administration degrees. Here we describe two programs that start with a Cornell Engineering B.S. degree and one that considers a joint MEng. Degree from the Engineering College with an M.B.A. from the Johnson School.

JOINT B.S./M.ENG. (CIVIL) /M.B.A. AND JOINT B.S./M.B.A.

Two special programs make it possible for students to earn degrees from both a bachelors' degree from the College of Engineering and an M.B.A. from Johnson Graduate School of Management. One program, completed in five years, leads to a B.S. degree in engineering and a Master of Business Administration (M.B.A.) degree. The other program, which takes six years, earns three degrees: the B.S. in engineering, the Master of Engineering (M.Eng.), and the M.B.A.

Both programs require taking a specific set of courses at the undergraduate level; these curricula allow for a shortening of the combined programs by one academic year. Information about the specific requirements for each area is available from the appropriate undergraduate major coordinator and graduate program coordinator. The curriculum must include nine core courses required for the M.B.A. or allowed substitutes. See the [*Engineering Undergraduate Handbook*](#).

Students who decide to pursue either of these programs should take the GMAT exam, which is required by the Johnson School of Management, in March of their junior year (or earlier).

The joint B.S./M.Eng (Civil)./M.B.A. program is very attractive in that both Masters degrees are received within two years after the B.S. This program must be initiated in the junior year. This special program requires early planning so those electives taken during the junior and senior year can be used to meet requirements of the M.B.A. degree. By March 1 of the sixth term of enrollment, a student must apply for admission to the M.B.A. program through the Johnson Graduate School of Management. Application to the M.Eng. program should take place by February 1 in the student's senior year at Cornell. Students are encouraged to go to Engineering Advising and the Johnson School for more information.

Joint M.Eng./M.B.A. Program

For those interested in both the M.Eng. and M.B.A. degrees, but who do not participate in the six-year joint program described above, an alternative opportunity is the five-semester joint program. Application to this program can begin as late as the first few weeks of enrollment in the M.Eng. program. The five-semester program is open to students with B.S. degrees from Cornell or elsewhere.

Master of Science and Ph.D. Programs

Some students pursue a research-oriented Master of Science (M.S.) program either here or elsewhere, and an increasing percentage of our students continue on to the Ph.D. for careers in research, teaching, or consulting. Some students prefer to take a job immediately after receiving the B.S. and then return for graduate study a few years later. Ask your advisor, professors, or the Director of Graduate Studies for information about graduate study in the area that interests you.

Early Admission

Cornell undergraduates who have between one and eight credit hours to earn towards completion of their undergraduate degree in the last semester of their senior year may apply for "early admission" to the Master of Engineering program. If approved, the student may begin earning credits towards their Master of Engineering degree while completing their undergraduate degree. (Double-counting of credits will not be allowed; credits used towards undergraduate requirements may not also be used towards M.Eng. requirements.) Admitted applicants must spend a minimum of one semester registered with the Graduate School. There are two advantages to starting the M.Eng. Program early: (1) students may take a slightly heavier course load and complete the M.Eng. degree in one Graduate School semester after completion of the undergraduate degree; or (2) students may either take a lighter course load over two Graduate School semesters upon completion of the undergraduate degree or take extra courses they are interested in that do not count towards the M.Eng. Degree. A special form and guidance are required before submitting the Graduate School application for Early Admission; therefore you need to see the Graduate Program Coordinator of the Field you intend to apply to for this form and instructions.

XI. Academic Integrity and Plagiarism

Absolute integrity is expected of every Cornell student in all academic undertakings. Integrity entails a firm adherence to values most essential to an academic community, including honesty with respect to the intellectual efforts of oneself and others. Both students and faculty at Cornell assume the responsibility of maintaining and furthering these values. However, a Cornell student's submission of work for academic credit implies that the work is the student's own. Outside assistance should be acknowledged, and the student's academic position truthfully reported. In addition, Cornell students have the right to expect academic integrity from each of their peers. It is plagiarism for anyone to represent another person's work as his or her own. As stated in the University Code of Academic Integrity, "The maintenance of an atmosphere of academic honor . . . is the responsibility of the student and faculty . . ." Gray areas sometimes exist when students study and work together. It is important that faculty state clearly what is expected, and that students understand what authorship citations an instructor expects. To become better acquainted with academic integrity responsibilities, each student should read the Code of Academic Integrity. A copy may be obtained from the Engineering Advising Office, 180 Rhodes Hall, or from the Dean of the Faculty, 315 Day Hall. Also available on the web at: <http://theuniversityfaculty.cornell.edu/academic-integrity/code-of-academic-integrity/>

XII. Freedom from Sexual Harassment

The College feels it is essential for the well-being of the University community that every individual be treated with respect. Sexual harassment and sexist comments are incompatible with this goal.

Unwelcome sexual advances, requests for sexual favors, or other verbal or physical contact or written communication of a sexual nature is sexual harassment when any of the following occurs:

1. Submission to such conduct is made either explicitly or implicitly a term or condition of employment or academic standing; or
2. Submission to or rejection of such conduct is used as the basis for employment or academic decisions affecting the individual; or
3. Such conduct has the purpose or effect of unreasonably interfering with an individual's work, academic performance, or participation in extracurricular activities; or creating an intimidating, hostile, or offensive working or learning environment.

Any student, staff employee, or faculty member who believes she/he has been victimized by sexual harassment is encouraged to promptly contact a title IX coordinator via the Office of Workforce Policy and Labor Relations at (607) 254-7232 or equalopportunity@cornell.edu. Individuals may also contact the University Ombudsman at (607) 255-4321 in 118 Stimson Hall, 8:30am-4:30pm Monday-Friday or other times by appointment.

XIII. Honors, Awards, Prizes and Competitions

Dean's List

In each term, students in the College of Engineering achieving a grade point average of 3.5 (without rounding) or greater, based upon a record including 12 credits of letter grades, with no failing grades, unsatisfactory grades, incompletes, or missing grades, are recognized by selection to the Dean's List. Students may earn Dean's List status retroactively if they meet these criteria after making up incompletes according to College rules.

Graduating with Distinction

Cornell University awards diplomas with the designation *Cum laude*, *Magna cum laude*, or *Summa cum laude* to graduating seniors who met specific grade point average benchmarks. This is subject to the absence of unsatisfactory grades, incompletes, and missing grades.

- *Cum laude*: graduating students whom overall, or in their last four terms (in each of these terms, at least 12 letter-grade credit hours must be taken), achieve a grade point average of 3.50 (without rounding) or greater.
- *Magna cum laude*: earned with a grade point average of 3.75 or greater based on all credits taken at Cornell.
- *Summa cum laude*: students who attain a GPA of 4.0 or higher for all credits taken at Cornell receive a diploma with this designation.

Graduating with Honors

Students successfully completing the CEE Honors Program (see page 11 for requirements) will be awarded their diplomas with a note stating “*with Honors*” and it will be noted on their official transcript..

Honors, Awards, Prizes, and Competitions

The following are descriptions of the awards, prizes, and competitions available annually to students in Civil and Environmental Engineering.

ASCE John P. Riley '22 Award

Established in 1990 to honor John P. Riley '22, who had been an active member of ASCE and past president of the NYC Metropolitan Section. This award provides a first-year membership to ASCE for a member of the Civil and Environmental Engineering graduating class who is a member of the Cornell Student Chapter of the American Society of Civil Engineers and has rendered meritorious service and special leadership to fellow students and to the Civil Engineering profession.

ASCE Marshal Case Haggard Award

Established in 1992 in memory of Marshal Haggard '81, president of the Cornell ASCE Student Chapter in 1980–81, who lost his life while in service in the Peace Corps in Nepal. It is presented to a member of the student chapter in recognition of outstanding contributions to the community, following the role of Marshal, who had a strong influence in developing the service activities that have become a tradition of the Cornell chapter.

ASCE Winslow T. Shearman (Student Merit) Award

The Ithaca Section established the ASCE Student Merit Award in 1932. It is presented annually to a member of the Civil and Environmental Engineering graduating class of Cornell University who is an active member of the Cornell Student Chapter of the American Society of Civil Engineers and is considered most worthy of this honor by virtue of high character and academic achievement.

ASCE Student Service Award

The Ithaca Section of ASCE established the ASCE Student Service Award in 1960. It is presented annually to a member of the Civil and Environmental Engineering graduating class who is also a member of the Cornell Student Chapter of the American Society of Civil Engineers and has rendered the most meritorious service to fellow students and to the profession of Civil Engineering.

Becker Global Education Award

This award was established in 2014. The primary objective of this award is to provide opportunities for students to have a global experience. Sophomores and juniors affiliated with the School of Civil and Environmental Engineering are eligible to apply. Funding varies and is dependent on proposal.

Clark Construction Scholarship

A monetary award and certificate presented to a junior Civil and Environmental Engineering student. The award is given to a student with an interest in construction management for academic merit, leadership, and extracurricular activities. The recipient of the award must have a cumulative GPA of at least a 3.0 and be a U.S. citizen. There may be other conditions as set by the Clark Construction Group, Inc.

Margaret Arronet Corbin '21 Prize

This award of approximately \$4,000 and a certificate is presented on Commencement Day to a graduating Civil and Environmental Engineering student. The award is given to a senior who combines academic excellence with meritorious activities and service within the Cornell community and has demonstrated a commitment to continuing his or her education in the field of civil engineering. Margaret Arronet Corbin was a pioneering female civil engineer who spent two years with President Hoover's famine relief effort in Russia before beginning her long career with the Portland Cement Association in Chicago.

Charles Lee Crandall Essay Contest

The Charles Lee Crandall Prizes are given annually by the School of Civil and Environmental Engineering for the best papers written by juniors or seniors. There are no restrictions on subject material other than to have

some direct or indirect connection with civil and environmental engineering. First prize is \$2,000 and second prize is \$1,000. Details are available in Spring of each year.

Fuertes Medal

The Fuertes Medal was established in 1893 by the late Professor E.A. Fuertes, Dean of the College of Civil Engineering. The endowment awards a gold medal and a certificate that is awarded annually on Commencement Day by the faculty of the School of Civil and Environmental Engineering to the graduating senior whose scholastic achievement is most distinguished over the four consecutive years of study at Cornell.

Ve-Sing and Tseng Soo Koo Award

The Ve-Sing and Tseng Koo endowment was established in 1990 by Professor Benjamin Koo, Ph.D. '46. This prize, consisting of approximately \$4,000 and an award certificate, is awarded to an outstanding student of structural engineering in Civil and Environmental Engineering who is planning to pursue graduate studies at Cornell University.

John E. Perry Undergraduate Prize

The John E. Perry Undergraduate Prize, consisting of a certificate and a check for \$500, is awarded on Commencement Day to select graduating Civil and Environmental Engineering students. The award is given to members of the graduating class who demonstrated "enthusiastic participation in student life and commitment to the profession of engineering", in addition to scholarship. Perry Prize winners are chosen by CEE faculty and students by ballot.

John E. Perry Teaching Assistant Prize

Established in 1985, this award is given annually to the teaching assistant(s) within the School of Civil and Environmental Engineering whom "exhibits concern and care for the students in his or her class and fulfills the teaching functions enthusiastically and skillfully." The winner is identified using a ballot distributed to faculty and students. The award consists of a certificate and a check ranging from \$100-\$500.

Water Advocate Award

This \$2,000 award was established in 2013 to recognize student's enthusiasm and dedication to careers and lives focus on safeguarding clean water.

Note: *Awards may be taxable. Taxes will be withheld automatically for students from some countries/ territories. Please contact the [Cornell University Tax Office](#) or your tax advisor if you have any questions.*

Appendix A

Professional Engineering Licensing Information

**Information on Engineering Licensing can be obtained from the NY State
Office of the Professions web site:**

<http://www.op.nysesd.gov/prof/pels/pelic.htm>

Appendix B

American Society of Civil Engineers (ASCE) Code of Ethics

Information on the ASCE Code of Ethics can be found on the ASCE web site:

<http://www.asce.org/code-of-ethics/>